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MOTOR VEHICLE INSPECTION PROJECT

NATO Committee on the Challenges of Modern Society

Prepared for:

National Highway Traffic Safety Administration

March 1974

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COMMITTEE ON THE CHALLENGES OF MODERN SOCIETY

CCMS REPORT NO. 24

INSPECTION DES VÉHICULES À MOTEUR

COMITÉ SUR LES DÉFIS DE LA SOCIÉTÉ MODERNE

RAPPORT N°24 DU CDSM

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PREFACE

On April 10, 1969 – less than four months after taking office – President Nixon called for NATO to take action on environmental problems, declaring:

> "... (NATO) needs a social dimension, to deal with our concern for the quality of life in this final third of the twentieth century ... the industrial nations share no challenge more urgent than that of bringing 20th century man and his environment to terms with one another ..."

In November 1969, NATO accepted the President's proposal, established the Committee on the Challenges of Modern Society – CCMS – and directed it to improve in every practical way the exchange of views and experience among the allied countries in the task of creating a better environment for their societies, and to consider specific problems with the deliberate objective of stimulating action by member governments.

To carry out its mandate, CCMS has developed a novel approach under which one NATO member as "Pilot" assumes the responsibility to undertake and complete a program. With one-nation leadership, programs move ahead quicker than under the working committee approach which is characteristic of most international efforts. Also, the need for an international secretariat is substantially reduced.

ROAD SAFETY PILOT STUDY

At the first CCMS meeting in late Fall 1969, the U.S. Representative to CCMS proposed all aspects of road safety – vehicle, highway, driver – as a CCMS effort which the U.S. would lead. NATO accepted. The National Highway Traffic Safety Administration of the Department of Transportation conducted the Study for the U.S.

The Road Safety Pilot Study was divided into seven projects, each led by a NATO ally: *Motor Vehicle Inspection* – Federal Republic of Germany; *Emergency Medical Services* – Italy; *Alcohol and Highway Safety* – Canada; *Pedestrian Safety* – Belgium; *Accident Investigation* – the Netherlands; *Identification and Correction of Road Hazards* – France; and *Experimental Safety Vehicles* – United States. Each of these efforts was a self-contained project in its own right and apart from overall coordination by the U.S. as Pilot Country has been directed by the NATO country indicated. The other allies have participated in those projects of major interest to them and such participation is noted in the final report for each of the seven projects. The conclusions and recommendations contained in these project reports are in turn discussed in the overall Pilot Study report.

The basic purpose of CCMS is to stimulate government action – not research per se. While more research is needed in all aspects of road safety, the CCMS premise is that much is already known in one country which other countries might utilize or adapt to their unique problems. Thus, an overriding goal of all of the road safety projects has been to organize the existing knowledge on road safety programs of proven effectiveness in a manner that will facilitate putting these programs into practice where they are not now in operation.

MOTOR VEHICLE INSPECTION (MVI)

MVI is concerned with the examination of vehicles to assure that they meet some level of safety performance. As certain critical mechanical items on a vehicle wear and deteriorate they may constitute a safety hazard either to the operator or the public. It has been stated that MVI is an effective way to assure determination and correction of the major or more important safety related defects. As logical as this may sound and even though MVI is included in the road safety programs of many countries, the cost effectiveness or benefit of MVI has yet to be quantified. Studies have revealed that vehicle defects either cause or increase the severity of 6 percent to 18 percent of all accidents. This can be compared with 85 percent to 97 percent for driver related factors. That MVI does reduce the percentage of accidents caused by vehicle defects, however, has not been established, and there may be other countermeasures that could be more cost-effective; e.g., reliability improvement, on-board diagnostic sensors, and elimination of defects through better design.

The CCMS Motor Vehicle Inspection Project was organized to study MVI in various countries. This increased the interest in the issue of safety benefits produced by motor vehicle inspection versus its costs.

The Project has collected, compiled, compared and evaluated the knowledge and experience of many countries in the field of motor vehicle inspection. The conclusions drawn will help all those interested in improving their respective systems.

PROJECT HISTORY

Because of its particular interest and long involvement in motor vehicle inspection, the Federal Republic of Germany agreed to lead this project. German and United States experts started early in 1971 by preparing a questionnaire concerning the inspection programs of the various NATO countries participating in the project. This was followed by a meeting of all project delegations in Cologne in October 1971 to discuss the German motor vehicle inspection system and to visit the commercial and official motor vehicle inspection related facilities. At this meeting it was agreed that the German representatives would summarize the responses to the questionnaires, the U.K. and U.S. would provide some additional material, and that the F.R.G., U.K., and U.S. representatives would draft the final report. Belgium and Denmark representatives joined this drafting committee later.

In a meeting of this five member drafting committee in Berlin in October 1972 it was agreed that each of the five would prepare a description of motor vehicle inspection in their respective countries. This description, included in the project report, contains a discussion of the justification and experience of each aspect of the motor vehicle inspection program in the five countries.

In addition to the nature and scope of the given program, the description covers the following topics: legal provisions, quality control, compulsory and voluntary measures, defect recall programs, frequency of inspection, institutions in charge, fees, collection and use of data, qualification and training of personnel, use of inspectors and supervisors, use of automated inspection, and consumer interest.

On April 30 through May 4, 1973, a meeting of project participants was held in Washington, D.C., to draft conclusions and recommendations, as well as to review a draft of the final report.

ORGANIZATION OF THE REPORT

The final report consists of the Introduction, descriptions of MVI in each of five countries, followed by conclusions and recommendations. The description of MVI relates to certain aspects of MVI pertaining to Belgium, the Federal Republic of Germany, Denmark, the United Kingdom and the United States on a country by country basis. Thus, comparisons of practices or aspects of MVI in one country are easily made with those of the other countries. A rather detailed table of contents is provided in order to orient the reader or direct him to a particular aspect in which he might be interested.

ACKNOWLEDGEMENTS

This report was prepared by a group of experts consisting of the following members:

Jean B. Cornelis,	Groupement des Organismes de Contrôle Automobile, Belgium
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David V. Teasdale,	Department of the Environment, United Kingdom

The Introduction, as well as the Conclusions and Recommendations, have been jointly formulated by the Drafting Committee listed above. The descriptions of MVI in each country were prepared individually by these representatives.

Other participating countries were France, the Netherlands, Italy, Canada, and Turkey.

TABLE OF CONTENTS

PREFACE . . . iii
INTRODUCTION . . . 3
BELGIUM . . . 15
  General Remarks . . . 15
  Institutions in Charge of Inspection . . . 28
  Qualification and Training of Personnel . . . 30
  Additional Considerations . . . 31
FEDERAL REPUBLIC OF GERMANY . . . 35
  General Remarks . . . 35
  Institutions in Charge of Inspection . . . 40
  Qualification and Training of Personnel . . . 44
  Additional Considerations . . . 46
DENMARK . . . 51
  General Remarks . . . 51
  Institutions in Charge of Inspection . . . 55
  Qualification and Training of Personnel . . . 64
  Additional Considerations . . . 66
UNITED KINGDOM . . . 73
  General Remarks . . . 73
  Institutions in Charge of Inspection . . . 78
  Qualification and Training of Personnel . . . 80
  Additional Considerations . . . 81
UNITED STATES . . . 91
  General Remarks . . . 91
  Institutions in Charge of Inspection . . . 107
  Qualification and Training of Personnel . . . 109
  Additional Considerations . . . 110
CONCLUSIONS AND RECOMMENDATIONS . . . 113
REFERENCE LIST OF PUBLICATIONS . . . 115

PART ONE

INTRODUCTION

General Remarks

Institutions in Charge of Inspection

Qualification and Training of Personnel

Additional Considerations

PART ONE **INTRODUCTION**

General Remarks

The imperfection of man and of his technical achievements preclude, as a basic rule, absolute safety. This means that it will never be possible to avoid accidents completely. The aim of road traffic safety may therefore be described as taking the most effective measures possible to reduce the accident risk. The measures necessary for this purpose depend for their effectiveness on the extent and accuracy of knowledge of the factors which influence accidents. Research into accident causation serves to enlarge this knowledge; this research is being continuously intensified in many parts of the world, in view of the steady rise in road accidents. In spite of unquestionable successes in these endeavors, most clearly indicated by the fact that the proportional increase in the number of officially recorded accidents is in most cases lower than that of vehicle population and usage, the time will never come when the problem of road traffic safety can be considered as definitely solved; all that can be expected is to move closer if indirectly to a solution. This stuttering progress will be accompanied by increasing expenditure of money and effort.

Research into accident causation has revealed that the proportion caused by human negligence, or error, is far greater than that due to failure of technical installations and equipment. Two lessons may be derived from this for road traffic, the safety of which still depends to a very large extent on the actions and reactions of the drivers: firstly, that the emphasis of all endeavors for safety must lie on the instruction and continued training of road users, and on sharpening their sense of responsibility; and secondly, that by the further development of technical safety equipment the dependence of traffic safety upon the limited reaction ability of the human being may be diminished and the accident risk reduced. This leads directly to the subject of technical supervision, for every technical installation is subject to wear and consequently needs to be maintained. Therefore, with the increasing shift of the responsibility for safety from man to technical equipment, the supervision of this equipment is gaining in importance.

The purpose of this project study is in the first place to collect and to compile the knowledge and the experience of many countries in the field of motor vehicle inspection (MVI) and to compare and evaluate them. The conclusions to be drawn from this will help all those interested to improve their respective system and to adapt it to the increasing demands to be made on road traffic safety and environment protection. And finally, the international cooperation of the experts, which is necessary for the elaboration of this study, is intended to make a contribution to the worldwide coordination of the relevant technical standards.

THE MOTIVATION FOR MVI

Any technical equipment is subject to wear and failure and therefore requires maintenance and service. Since these activities can hardly be automated and are usually expensive, because of the increasing labor costs, the trend in modern technology is towards wear-resistant equipment, which in ideal cases is maintenance free within its intended service life (e.g., refrigerator). Even if this ideal aim cannot in many cases be fully achieved with some more complex technical appliances of daily use, the consumer is nevertheless used to not maintaining such appliances but to have them repaired when they break down. Consequently, what is generally understood by "service" is in such cases only a system of specialist repair capacity that is at everyone's disposal when needed; it has nothing to do with preventive maintenance. The fact that this habit is often applied to the motor car is not surprising when the car manufacturers themselves emphasize, in their advertising, how little servicing their products need; but what distinguishes the motor car from other types of product, and makes preventive maintenance important, is that its breakdown can involve loss of life, and its deterioration can adversely affect the environment. Despite this there is a tendency (assisted by the increasing cost of car ownership) for maintenance to be forgotten. This is the initial justification for compulsory vehicle inspection; and, in fact, various opinion polls (e.g., in Belgium, and in France) have shown that the public in general accept this need.

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ROAD SAFETY BENEFITS OF MVI

A quantitative relation between improvements in vehicle condition following inspection, and the frequency and seriousness of accidents caused by vehicle defects, has not been established. The official accident statistics show a very low quota of accidents which are clearly due to mechanical defects. The difficulties of assessing the various factors contributing to, or affecting the number and gravity of, accidents are, however, undervalued. The policeman who records an accident normally has neither had sufficient technical training, nor has he enough time or means, to reconstruct with accuracy the often very complex causes of the accident from the effects he has before him. Many accidents involving minor personal injury or vehicle damage, which may be influenced by MVI, do not even appear in the official statistics, because they are not brought to the attention of the police. The data of the official accidents statistics are not, therefore, a final argument for or against the value of MVI as a safety measure. There has been no lack of attempts to prove its effectiveness in reducing road accidents and casualties, but none has yet been conclusive. Special accident investigations have been mounted in various countries and data obtained which does not suffer from the deficiencies noted above, and indicating the proportion of accidents affected to some degree by mechanical defects. (References are made to such data as is available in Parts 2-5.) But nowhere does a reliable comparison exist with the pretesting situation.

COST BENEFIT ANALYSIS

In one of the countries concerned – United Kingdom – cost benefit analysis has been carried out on the road safety value of MVI. This method of assessment is used by some Governments to aid decision making in fields like road safety where there are competing demands for limited financial resources. But cost benefit analysis of MVI is not without problems. The quantification of both the costs, and the benefits, present difficulties, and must be subject to argument. There are also special problems in applying cost benefit analysis in this field in which part, at least, of the benefit takes the form of lives saved, and grief and suffering prevented. But if the same minimum values are placed on these benefits, in analyzing the different road safety measures, choices and priorities (in terms of fruitful allocation of resources) can be established. At the same time cost benefit analysis should ensure that important considerations are not ignored because they are difficult to quantify.

The U.K. cost benefit study indicated that, in accident prevention terms, the total costs of MVI to the community may be in excess of the road safety benefits. (The details of this analysis, the methodology, assumptions, etc., are stated on page 73.) A criticism of this analysis is that it considered only the safety (i.e., road accident and casualty reduction) benefits of MVI. The other benefits may be even more difficult to quantify but they can certainly not be ignored in any balanced picture of the value of MVI programs.

ADDITIONAL BENEFITS OF MVI

Environmental Benefits

There is international concern today about noise and pollution from motor vehicles. Laws are being introduced in many countries (and under organizations like the EEC and ECE) to raise new vehicle standards. Some in-use controls, operating on the existing vehicle population, are also important, and indeed anticipated and desired by the public at large. The inclusion of noise and pollution checks in periodic testing schemes appears the logical answer, and indeed the environmental value of such regular controls is one of the main arguments stated by the EEC Commission for the proposal to harmonize MVI arrangements in the Common Market. Certainly Belgian experience indicates the improvements which can be obtained, as shown in Figure 1.

NATO/CCMS VEHICLE INSPECTION REPORT

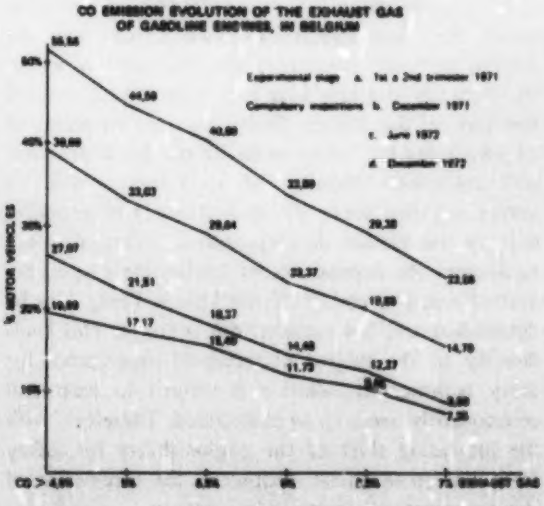

FIGURE 1

Economic Benefits

For all vehicles, there are a number of possible economic benefits from improvements in maintenance standards, and average condition, brought about by periodic testing:

1. Higher average speeds, leading to quicker journeys;
2. More reliability, and therefore fewer breakdowns (costly in themselves) and better vehicle utilization; which could lead to a reduction in vehicle fleets;
3. To the extent that periodic testing encourages an emphasis on regular maintenance, repairs may sometimes be more timely and therefore cheaper;
4. Vehicles may have a longer average life (this has been claimed for cars in Sweden);
5. Reduction in costs of accident damage.

It would require a long and complex research project to quantify these benefits. A considerable part of the work would have to be devoted to assessing testing's contribution to their achievement. But if, from (2) above, as little as half a day per vehicle per year were involved, the saving would be significant. And in the U.K. for instance, some HGV operators have claimed that the annual testing scheme (introduced in 1968) has compelled the introduction of regular maintenance schedules which are saving costs in comparison with previous arrangements. Certainly maintenance standards have improved. The number of prohibition notices issued at roadside checks was 37.5 per 100 vehicles examined in 1967/68, the first year compulsory annual testing of HGVs was introduced. In 1970/71 the comparable figure was 19.3.

Traffic Flow Benefits

With today's overcrowded cities, and trunk routes, governments have a clear interest in promoting quieter and easier traffic flow. MVI can contribute to this through improving the average condition of vehicles, so that they may assist the free movement of traffic by faster speeds and reduced breakdowns.

Benefits in Equalizing Conditions of Competition

It has long been acknowledged that with commercial vehicles it is very important to prevent unscrupulous operators gaining a cost advantage over their competitors by skimping on maintenance. Such an advantage is selfishly gained at the expense of public safety, and this is irresponsibility which needs to be curtailed. Periodic testing of vehicles (possibly supplemented by random checks) is a form of control recommended by the EEC Commission in their justification for the draft directive on MVI.

Consumer Benefits

There are two main kinds of direct benefits, for consumers, from compulsory MVI programs. Firstly, buyers of secondhand cars, by insisting on a new or recent test certificate, can gain some reassurance about a vehicle's mechanical condition. (In some countries tests on change of ownership are, in fact, compulsory.)

Secondly, the statistics from vehicle testing (about failure rates, defects, etc.) can be collated and published to provide consumers with valuable information about the performance of particular vehicles, and components, in use. Strong and weak points in particular models can become evident through the data from MVI programs. An example is the German publication "TÜV-Autoreport '73" (see page 117).

Design and Development Benefits

Control of vehicle in use standards, through periodic testing, can both compel and encourage the development of greater reliability in vehicles and components. Statistics from testing are also a valuable form of feedback for the manufacturers, to assist them in design improvements – both as a form of measurement, and as an indication of priority development areas. In the U.K. for example, experts have noted significant improvements in the design of HGVs since the introduction of compulsory testing. Periodic testing also represents a convenient and effective method of checking that vehicle type approval requirements are still met.

Comfort and Convenience Benefits

PSV inspections must also have regard to the comfort and convenience, as well as the safety, of fare-paying passengers. These are accepted in most countries as important, if subsidiary, objectives in compulsory testing of PSVs.

Vehicle Overloading Benefits

In many countries the annual test of HGVs includes a check that the vehicle is still capable of carrying its maximum permitted weight. There are a number of possible modifications to a vehicle which may affect its original rating. Such enforcement is conveniently carried out in testing stations, and has direct safety and economic benefits as well as helping to protect roads and bridges.

Enforcement Benefits

Most countries have vehicle construction and use regulations, and without compulsory testing it is doubtful if these are effectively enforced. The Police may not be prepared, or considered sufficiently specialized, to cope with this task. But there are basic questions to consider – whether, on road safety grounds (or any others considered to be important) these regulations should be enforced; even, perhaps, whether such regulations are necessary at all; or whether the standards set in the regulations are the appropriate ones. (Are they, for instance, imposing unnecessarily high – or dangerously low – costs on vehicle users and manufacturers?) In relation to the establishment, and scope, of MVI programs these may be vital questions.

AN INTERNATIONAL VIEWPOINT

It would be of benefit to establish an international viewpoint on MVI, based on expert opinion in countries practicing it, and by cooperation with international bodies (e.g., CITA) and organizations (e.g., EEC, ECE, ECMT, and NATO/CCMS). (See next section.) Already there is an example of such cooperation, in the CITA involvement in the preparation of the recent EEC proposals for harmonizing vehicle testing systems within the enlarged Common Market. It is the objective of this particular study to further international understanding, knowledge and cooperation on this subject.

INTERNATIONAL ORGANIZATIONS AND MVI

European Economic Community (EEC)

On September 8, 1972, a draft Directive was circulated to the Member States proposing the harmonization of the laws on MVI in the Community.

The motivation for this proposal was the equalization of conditions of competition between Member States (i.e., vehicles should be subject to similar controls), the improvement of road safety, and the reduction of noise and pollution from motor vehicles. Standardization in Member States' laws for MVI could make an important contribution to these aims.

Member States – Belgium, Denmark, Eire, Federal Republic of Germany, France, Italy, Luxembourg, the Netherlands, and United Kingdom.

Economic Commission for Europe (ECE)

On September 21, 1956, the Sub-Committee of Road Transport passed Resolution No. 80 which namely recommended that the governments:

1. Check the following vehicles at least once a year (especially on the braking equipment):
   - Motor vehicles and trailers with more than 8 seats (not including the driver's seat) used for the transport of persons;
   - Motor vehicles and trailers used for the transport of goods;
   - Taxis.
2. Make this periodic inspection compulsory also for the oldest motor vehicles in the other categories.

This recommendation was confirmed and defined more accurately in 1969. It was also embodied (No. A-19) in the general resolution with regard to "Road Traffic and Signalling." A list of recommended items for inspection was added to this resolution.

Countries Involved – Austria, Belgium, Czechoslovakia, Federal Republic of Germany, France, Hungary, Italy, Luxembourg, the Netherlands, Spain, Sweden, United Kingdom, and Yugoslavia.

European Committee of Ministers of Transport (ECMT)

On October 20, 1959, the ECMT recommended that the member countries, which had not done so yet, approve Resolution No. 80 of the EEC Sub-Committee of Road Transport. MVI has been included in the road safety working program (1972) of the ECMT.

Countries Involved – All EEC countries plus Austria, Greece, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, and Yugoslavia.

CITA

The International Committee for Technical Inspection was founded in 1969 and is composed of the delegates of 17 countries.

The principal aim of the Committee is to promote international collaboration between its members in order to increase understanding in their views on problems relating to the compulsory inspection of motor vehicles, particularly with respect to technical and administrative problems.

The Committee initiates studies likely to further its aims, including:

- Standardization of inspection methods;
- Development of standardization of inspection equipment;
- Standardization of criteria for the approval or the rejection of vehicles.

Interchange of information is arranged through the CITA secretariat in Brussels, and a conference of delegates is arranged each year.

Figures 2 through 9, which follow, contain summaries of information on certain aspects of motor vehicle inspection as conducted in several nations.

COUNTRIES HAVING CONTRIBUTED FACTS AND FIGURES TO THE MVI PROJECT

Code	Country	Member of NATO	Member of CITA
A	Austria	–	X
B	Belgium	X	X
CDN	Canada	X	–
CH	Switzerland	–	X
D	Germany	X	X
DK	Denmark	X	X
E	Spain	–	X
F	France	X	X
UK	United Kingdom	X	X
GR	Greece	X	–
I	Italy	X	X
IL	Israël	–	X
IS	Iceland	X	–
L	Luxembourg	X	–
MA	Morocco	–	X
N	Norway	X	X
NL	Netherlands	X	X
P	Portugal	X	–
S	Sweden	–	X
SF	Finland	–	X
TR	Turkey	X	–
USA	United States	X	–

FIGURE 2

BASIC REGULATIONS FOR MOTOR VEHICLE INSPECTION AND YEAR OF STARTING OFFICIAL MOTOR VEHICLE INSPECTION.

Code	Country	Basic regulations	Year of starting inspection	Remarks
A	Austria	Law of 1967	1968	
B	Belgium	Royal Decree of 1968 Ministerial Decree of 1947	1933 1936	buses trucks
CDN	Canada	Federal Minister of Transport establishes safety standards only for newly manufactured and imported motor vehicles; each province has jurisdiction over inspection of vehicles in use; considerable differences in inspection programs, and in some instances no program at all		
CH	Switzerland	Road Traffic Law arts. 13 and 29. Decrees on the construction	1964	periodical inspection
D	Germany	Road Traffic Regulations and some decrees	.910 1938	new vehicles periodical inspection
DK	Denmark	Ministry of Justice Regulations and detailed regulations made by the Government Motor Vehicle Inspectorate		
E	Spain	Road Traffic Regulations	1934	
F	France1	Inspection of trucks and trailers exceeding 6 t total weight, vehicles for public transport and driving-school	1954	
UK	United Kingdom	Road Traffic Act 1960 Road Safety Act 1967	1930 1960 1968	buses cars trucks
GR	Greece			
I	Italy	Road Traffic Regulations of 1959		
IL	Israel	Road Traffic Regulations	1948	

FIGURE 3

Code	Country	Basic regulations	Year of starting inspection	Remarks
IS	Iceland			
L	Luxembourg			
MA	Morocco	Ministerial Decree 1934	1934	
N	Norway	Technical Regulations	1927	
NL	Netherlands	Different Regulations	1937 1959	buses and taxis trucks
P	Portugal			
S	Sweden		1956	
SF	Finland	Different Regulations	1927	
TR	Turkey	Different Regulations		
USA	United States	Uniform Vehicle Code, adopted in part or in total as a State law by all States currently inspecting motor vehicles (31 States and the District of Columbia have adopted periodic inspection and 8 States have instituted inspection programs on a random basis) Motor Carrier Safety Regulations (for random inspection of trucks engaged in interstate hauling). USA Standard D7.1-1968 (Inspection Procedures for Motor Vehicles, Trailers, and Semi-trailers Operated on Public Highways)		

FIGURE 3 (Continued)

PERIODICITY OF INSPECTIONS/ MOTORCYCLES (QUESTIONNAIRE JANUARY 1971 AND CITA-INFORMATION)

Periodicity	Countries, indicated by code (see Figure 2)	Number of countries
no answer	GR IS L P	4
no periodic inspection	A B DK[1] E F UK I[2] MA N NL S SF USA (15 States)	13
3 years	CH	1
2 years	D[3,4]	1
1 year	CDN (1 Province) IL USA (19 States)	3
6 months	TR[3] USA (6 States)	2
random inspections	USA (8 States)	1
change of owner	USA (2 States)	1

[1] Inspection also in connection with first registration, except standard-type approved vehicles; moreover inspection in the event of change of owner according to the following lines:

a) if registered first time more than 5 years earlier,
b) if registered first time 5 . . . 10 years earlier and not inspected less than 2 years earlier,
c) if registered first time more than 10 years earlier and not inspected more than 1 year earlier.

[2] Additional: type approval inspection.

[3] Inspections only if more than 50 cm^3.

[4] Inspection also in connection with first registration, except standard-type approved vehicles.

FIGURE 4

PERIODICITY OF INSPECTIONS/ MOTOR CARS (QUESTIONNAIRE JANUARY 1971 AND CITA-INFORMATION)

Periodicity	Countries, indicated by code (see Table 1)	Number of countries
no answer	GR IS L P	4
no periodic inspection	DK[1,2] E F MA N NL[3] USA (9 States)	7
5 years	I[2,4]	1
3 years	CH	1
2 years	D[5,6]	1
1 year	CDN (4 Provinces) USA (22 States)	2
1 year, but first inspection after:		
–4 years	B[3,7,8]	1
–3 years	A UK[9] S	3
–2 years	SF IL	2
6 months	TR[10] USA (9 States)	2
random inspection	USA (8 States)	1
change of owner	USA (2 States)	1

[1] Same regulations as indicated in Figure 4[1].

[2] Taxis and hire cars: 1 year; moreover inspection in connection with first registration irrespective of standard-type approval.

[3] Taxis and rental cars: 6 months.

[4] Type approval inspection in connection with first registration.

[5] Taxis and rental cars: 1 year.

[6] Inspection also in connection with first registration, except standard-type approved vehicles.

[7] Taxis and rental cars: inspection also in connection with first registration.

[8] Additional inspection:

a) in the event of change of owner,
b) when important modification is made,
c) after accident with damage to the body, steering, suspension or brakes.

[9] Taxis and rental cars: same regulation.

[10] Taxis and rental cars: 4 months.

FIGURE 5

PERIODICITY OF INSPECTIONS/ TRUCKS (QUESTIONNAIRE JANUARY 1971 AND CITA-INFORMATION)

Periodicity	Countries, indicated by code (see Table 1)	Number of countries
no answer	GR IS L P	4
no periodic inspection	N NL[1] USA (9 States)[2]	3
3 years	CH[1]	1
1 year	CDN (1 Province) D[3] [4] [5] E[6] F[7] UK[8] I[3] IL MA USA (23 States)[2]	9
1 year, but first inspection after:		
–5 years	DK[9]	1
–3 years	A[1] S	2
–2 years	SF[3]	1
6 months	B[10] USA (8 States)[2]	2
4 months	TR	1
random inspections	USA (8 States)[2]	
change of owner	USA (2 States)[2]	1

[1] Vehicles for the transport of dangerous goods (ARD): 1 year.

[2] Random inspection of trucks involved in interstate hauling, conducted additionally to the state inspection program by the (federal) Brueau of Motor Carrier Safety, U.S. Department of Transportation (DOT).

[3] Inspection also in connection with first registration, except standard-type approved vehicles.

[4] Trucks of up to 2.8 t admissible total weight: 2 years.

[5] Trucks of admissible total weight:
- over 6 t: additional special inspection of brakes every year, not more than 3 months before main inspection;
- over 9 t: moreover additional intermediate inspection 6 months after main inspection.

[6] Inspection for private vehicles required only if exceeding 3.5 t admissible total weight.

[7] Inspection required only for trucks over 6 t admissible total weight; inspection also in connection with first registration.

[8] If tare not exceeding 1524 kg: treated as cars (see Figure 5).

[9] Private vehicles: inspection also in connection with first registration.

[10] Inspection also in connection with first registration; moreover inspection:
- a) in the event of change of owner,
- b) when important modification is made,
- c) after accident with damage of the body, steering, suspension or brakes,
- d) in the case of ascertainment of load excess.

FIGURE 6

PERIODICITY OF INSPECTIONS/ MOTOR BUSES OF MORE THAN 9 PERSONS (INCLUDING DRIVER) (QUESTIONNAIRE JANUARY 1971 AND CITA-INFORMATION)

Periodicity	Countries, indicated by code (see Table 1)	Number of countries
no answer	GR IS L P	4
no periodic inspection	DK[1] N USA (7 States)	3
1 year	A B[2] CDN (2 Provinces) CH D[3] [4] E UK I[5] IL S USA (24 States)	11
6 months	F MA NL USA (9 States)	4
6 months, but first inspection after 2 years	SF	1
4 months	TR USA (1 State)	2
random inspections	USA (7 States)	1

[1] Inspection also in connection with first registration, irrespective of standard-type approval.

[2] Inspection also in connection with first registration; moreover inspection.
- a) in the event of change of owner,
- b) when important modification is made,
- c) after accident with damage to the body, steering, suspension or brakes,
- d) in the case of ascertainment of load excess.

[3] Inspection also in connection with first registration, except standard-type approved vehicles.

[4] Additional: Special inspection of brakes every year (not more than 3 months before main inspection) and intermediate inspection every 3 months.

[5] Inspection also in connection with first registration (individual acceptance).

FIGURE 7

PERIODICITY OF INSPECTIONS/ TRACTORS (QUESTIONNAIRE JANUARY 1971 AND CITA-INFORMATION)

Periodicity	Countries, indicated by code (see Table 1)	Number of countries
no answer	GR IS L P	4
no periodic inspection	DK[1] N NL USA (9 States)	4
3 years	CH	1
1 year	CDN (1 Province) D[2][3] E F UK I[2] IL MA USA (23 States)	9
1 year, but first inspection after:		
–3 year	A S	2
–2 year	SF	1
6 months	B[4][5] USA (8 States)	2
4 months	TR	1
random inspections	USA (8 States)	1
change of owner	USA (2 States)	1

[1] Tractors liable to registration: same regulations as indicated in Table 3[1]; (except tractors of up to 20 km/h).

[2] Inspection also in connection with first registration, except standard-type approved vehicles.

[3] Tractors of up to 40 km/h: 2 years;
– over 40 km/h: same regulations as for trucks (see Table 6) but additional intermediate inspection required already over 6 t total weight.

[4] Tractors of up to 20 km/h: no periodical inspection.

[5] Inspection moreover as indicated in Table 6[10], except tractors of up to 20 km/h.

FIGURE 8

PERIODICITY OF INSPECTIONS/ TRAILERS (QUESTIONNAIRE JANUARY 1971 AND CITA-INFORMATION)

Periodicity	Countries, indicated by code (see Table 1)	Number of countries
no anser	GR IS L P	4
no periodic inspection	MA N NL USA (9 States)	4
3 years	CH	1
1 year	CDN (1 Province) D[1][2][3] E[4] F[5] UK[6] I[7] IL USA (23 States)	8
1 year, but first inspection after		
–5 years	DK[7][8]	1
–3 years	A S	2
–2 years	SF[7]	1
6 months	B[9] USA (8 States)	2
4 months	TR	1
random inspections	USA (8 States)	1
change of owner	USA (2 States)	1

[1] Inspection also in connection with first registration, except standard-type approved vehicles.

[2] One-axle trailers of up to 2 t admissible total weight and caravan-trailers: 2 years.

[3] Trailers of admissible total weight:
– over 6 t: additional special inspection of brakes every year, not more than 3 months before main inspection;
– over 9 t: moreover additional intermediate inspection 6 months after main inspection.

[4] Inspection for private vehicles required only if exceeding 3.5 t admissible total weight.

[5] Inspection required only if exceeding 6 t admissible load; inspection also in connection with first registration.

[6] Trailers of up to 1 t: no periodical inspection.

[7] Inspection also in connection with first registration.

[8] Trailers of up to 3 t: no periodical inspection.

[9] Inspection moreover as indicated in Figure 6[10]

FIGURE 9

PART TWO

BELGIUM

General Remarks

Institutions in Charge of Inspection

Qualification and Training of Personnel

Additional Considerations

General Remarks

Although the motor vehicle is one of the most marvelous human realizations, it is also one of the machines that is the most heavily submitted to wear: nobody denies this evidence.

In spite of its actual first-rate construction, the progressive or even sudden deterioration of the motor vehicle is conditioned by the way we make use of it: brutal or unqualified drivers, insufficient maintenance, atmospheric conditions, collisions. Besides, we cannot deny that, having regard to the present opinion in matters of consumer goods, the motor vehicle no longer is constructed to "last," such as it was before.

Everybody admits that the excessive wear or deterioration of some items or parts of the vehicle can be a danger to traffic!

Therefore, it stands to reason that the maintenance of the motor vehicle must be *preventive* and that it must *permanently* be kept in a satisfactory working condition.

These considerations have brought most of the countries, which have a rather large number of motor vehicles, to adopt a preventive inspection system: the obligatory periodic inspection carried out at regular intervals.

In some cases, the Authorities had recourse to another system: the "random checks." This system is criticizable for many reasons, especially because only a small number of motor vehicles can be checked. Besides, the inspections are carried out under precarious conditions and with insufficient equipment; therefore, their technical quality is unreliable. To be efficient these checks should, on the one hand, be carried out with the help of apparatus that is as complete and accurate as that used at an inspection station, and, on the other hand, take place under the same conditions, which is impossible for road checks.

That is why random checks will only be admitted when the equipment required to carry out the periodic inspection is not available – or to strengthen the effect of this inspection. Indeed, a good solution that would make it possible to increase the efficiency of technical prevention, would consist in having checked at an inspection station a motor vehicle that is subjectively regarded as defective by the road police (delivery of a warning note). Besides, some road checks carried out by the road police are incontestably useful: check of the removable units such as the tires and more especially check of some nuisances (exhaust smoke of Diesel engines, CO emission, noise). Indeed, between two inspections these measures can vary and they can be carried out with the help of transportable apparatus. The other checks, to be technically valid, are to be carried out at the inspection station.

Even if it must be granted that the obligatory periodic inspection should be applied, the question nevertheless is whether this kind of prevention is sufficient for road safety. Indeed, in many cases the "prevention" risks default, namely:

- Motor vehicles that yearly cover very long distances (commercial travelers) and for which the maintenance is neglected because they are sold a year later (or even less than a year later);
- Passenger cars badly used by private persons with the object of learning to drive and which are sold not long after;
- Secondhand passenger cars that are sold because they have become defective;
- Summarily repaired passenger cars sold after they had an accident.

That is why in Belgium secondhand motor vehicles must be inspected *before they are registered*; motor vehicles that had an accident and of which the chassis, steering, suspension or braking equipment was damaged, must be inspected *before* they are put into use again. The Belgian experience with these motor vehicles, going back to 1960, proves that the most dangerous and dubious motor vehicles belong to these two categories. Attention must be drawn to the fact that the EEC Directive Proposition with regard to technical motor vehicle inspection, takes as a basis the periodic inspection, as well as the inspection of damaged and secondhand motor vehicles.

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Nevertheless, all the above-mentioned measures are not sufficient to guarantee technical prevention. Periodic motor vehicle inspection, however perfectly organized it is, may not alone be responsible for the safety of the motor vehicle. To reach this aim it is necessary to go more deeply into the problem, that is to say, it is indispensable to bring both factors, *maintenance* and *repair*, under regulation.

In many countries the vehicle owner is responsible for the maintenance of his vehicle. Such is the case in Belgium where the Regulations lay down that:

> "No motor vehicle shall be driven when it is not in good working condition or when it does not meet the requirements of the Regulations. It must regularly be overhauled, independently of the periodic inspections carried out by the organizations recognized by the Minister of Transport and entrusted with motor vehicle inspection."

This measure is quite insufficient! Indeed, as most vehicle owners are rank outsiders in this matter, they do not realize the full significance of this measure. Perhaps it is the reason why the the judges rarely avail themselves of this argument in cases of accidents due to technical defects.

The vehicle owner can, of course, apply to an agent of his vehicle make with whom he can enter into a maintenance agreement, but motor vehicles are democratized to such an extent that not everybody, and mainly people who buy secondhand cars, can pay for a maintenance agreement.

The Regulations must, therefore, make clear the obligations of the vehicle owner; they must lay down the periodical maintenance checks that are to be carried out and that must be recorded on an official document by somebody who is responsible and recognized as competent. At each periodic inspection this document should be shown to the motor vehicle inspection organization.

So far as we know, only Japan applies this priciple; the Japanese Authorities have therefore embodied the preventive measures in Regulations entitled: "ADMINISTRATION ON INSPECTION, MAINTENANCE AND REPAIR OF MOTOR VEHICLES."

Instead of shifting the responsibility of motor vehicle maintenance upon the only periodic inspection, basic measures must be taken, as we have already explained: the inspection should act as a supervisor.

LEGAL PROVISIONS, QUALITY CONTROL AND COMPULSORY MEASURES

Legal Provisions

In Belgium – The motor vehicle inspection organization is conditioned by the following legal provisions:

1. The Ministerial Decree of 10.8.1947 concerning the organization of the motor vehicle inspection system. The main provisions of this Decree are the following:
    - The Minister of Transport entrusts *recognized organizations* with the inspection (ten organizations for the whole country).
    - A well-defined *inspection area* is conferred to each recognized organization.
    - The inspection costs are entirely charged to the vehicle owner. The inspection fees are fixed by the Minister of Transport.
    - The inspection must take place in an inspection station that belongs to the recognized organization. (*They are thus obliged to be possessed of the necessary inspection stations.*) The inspection stations must be roofed and present all the requisite qualities that make it possible to check the vehicles easily and thoroughly. The action distance of each inspection station is limited to 20 km. The personnel must have at their disposal the requisite inspection equipment.
    - An engineer, who is a holder of a legal diploma, must be entrusted with the technical direction of each recognized organization.
    - The engaging and promotion conditions of the staff, as well as the minimum scales of salaries are fixed by the Minister of Transport.
    - Definition of the tasks the recognized organizations are entrusted with.
    - The standardization of the inspection documents.
2. The Royal Decree of 15.3.1968 concerning the technical requirements motor vehicles and trailers must meet.

    This Decree supersedes the ones of 1947 and its article 23 determines the motor vehicle categories subjected to the inspection, as well as the periodicities and impairments.

A synthesis of the obligatory inspection follows:

VEHICLE CATEGORIES	OBLIGATORY INSPECTION
BUSES and MOTOR COACHES (more than 9 passengers)	Before they are put into use, then every 3 months.
TAXIS, CARS LET OUT ON HIRE, MINIBUSES	Before they are put into use, then every 6 months.
UTILITY VEHICLES (Goods vehicles, Tractors, Trailers)	Before they are put into use, then every 6 months.
PASSENGER CARS	4 years after they were put into use for the first time, then every year.
VEHICLES USED BY SCHOOLS OF MOTORING	Before they are put into use, then every 6 months.
CARAVANS (and drawing vehicles)	Before they are put into use, then every year.
SECONDHAND CARS	Before any new registration.
DAMAGED CARS*	Before they are put into use again.

*A vehicle that had an accident in which the chassis, steering, suspension or braking system was damaged. Any vehicle for which, according to expert advice, the repair expenses amount to the minimum sum fixed hereunder, is reported to the Minister of Transport by the insurance company that had the valuation carried through.

Cylinder Capacity	*Damage* (not including the tax)
– Less than 1000 cm^3	20.000 Fr
– Between 1000 and 3600 cm^3	30.000 Fr
– Equal to or more than 3600 cm^3	40.000 Fr

Article 24 of the Decree of 15.3.1968 lays down that the concerned motor vehicles must be provided with a valid *inspection certificate*. The form of this document is imposed by the Minister of Transport.

3. The Ministerial Decree of 23.12.1970 contains the new juridical statute of the recognized organizations.

This Decree grants to the recognized organizations a renewable ten-year contract.

We will only lay stress on the following conditions respecting the exercise of their duties (we will hark back to the ones respecting the management later on):

"Article 9, §1. Any person having an interest or holding a position in a motor vehicle inspection organization is interdicted from:

1. having an interest or holding a position in a carrying company, a motor vehicle or motor vehicle fittings manufactory, a concern dealing with the construction or repairing of motor vehicles subjected to the technical inspection, as well as from favoring the above-mentioned concerns;
2. having an activity in a school of motoring or in connection with the insurance covering the civil liability in matters of motor vehicle, as well as from favoring the above-mentioned activities;
3. soliciting, demanding or receiving directly or through an intermediary gifts, rewardings or any other advantage.

"Article 9, §2. The requirements of §1 (1. and 2.) also apply to the wife or husband, but at her (his) duly justified request, the Minister of Transport or his delegate can make a departure from these provisions.

"Article 10. The motor vehicle inspection organization is answerable for the activities of the personnel it employs. At the request of the Minister of Transport or of his delegate, the motor vehicle inspection organization has to dismiss any person who does not any longer meet the requirements of this Decree, who has committed a breach of duty or given proof of heavy carelessness in the exercise of his duties."

The EEC Directive Proposition concerning the comparing of the legislations of the member countries with regard to technical motor vehicle and trailer inspection contains the following plan:

1. Compulsory periodic inspection:

● Motorcycles	4 years
● Private cars	● for the first time: 4 years after the first registration took place ● then every year The 4-year interval (on and after the first registration took place) is also to be applied when the vehicle has been, by virtue of

	articles 3 and 7, inspected within the first three years after the above-mentioned registration.
• Motor vehicles with a maximum of 8 seats (not including the driver's seat) that are not mentioned under points 1 and 2 and used either for the transport of passenger or for the transport of goods and passengers (motor vehicle rented with or without a driver, taxis, ambulance, minibus, etc.).	• for the first time: 2 years after the first registration took place • then every year
• Motor vehicles used for the transport of goods and of which the maximum admissible weight does not exceed 3.500 kg.	2 years
• Motor vehicles used for the transport of goods and of which the maximum admissible weight exceeds 3.500 kg.	1 year
• Motor vehicles with more than 8 seats (not including the driver's seat) used for the transport of passengers.	6 months
• Trailers with a maximum admissible weight of 1.500 kg. exclusively used for the transport of luggages, camping material or boats. Caravans.	2 years
• Trailers and semitrailers that are not mentioned above.	1 year
• Motor vehicles that do not belong to the above-mentioned categories.	2 years

2. One or more organizations or recognized experts may be entrusted with the inspection.
3. In addition to the periodic inspections, checks can also be carried out in the following cases:
   - Registration of a secondhand car in favor of a new owner;
   - When a motor vehicle is put into use again:
     - after some of the characteristics recorded on the registration certificate were modified,
     - after the chassis was replaced,
     - after the building of the motor vehicle was modified,
     - after the chassis, steering, suspension or braking equipment was badly damaged as a result of an accident.
   - When traffic inspectors find that the motor vehicle presents an anomaly of a nature to cast doubts upon its working condition.
4. The inspection does not exempt the holder of the registration certificate from watching over the good working condition of his vehicle.
5. The inspection fee is borne by the holder of the registration certificate.
6. The checks are to be carried out by State inspection stations, by appointed inspection organizations or by recognized workshops equipped with the necessary apparatus and under the responsibility of recognized experts.
7. The member countries may prescribe intermediate inspections on their territories.

Quality Control

The standardization of the inspection decisions is one of the essential requirements any inspection system must meet. In the eyes of the law all motor vehicles must be inspected in the same way and the decisions must be identically the same whichever the inspection station or whomsoever the inspector may be.

This is one of the greatest cares of any inspection organization worthy of the name.

In Belgium, the "standardization" is based on the following rules:

- The founding of a Training and Improving Center. To be admitted as a probationer, any new technical agent engaged on trial, must go through a course at the Training Center and pass an examination presided over by a delegate of the Administration in charge.

The courses principally bear on the technical and administrative Regulations, as well as on the apparatus and inspection method.

During the probation period (as a rule – 6 months) the candidate works under the supervision of a senior.

To promote, the candidate must go through a new course of a higher degree and pass an examination.

"Refresher" courses are also organized.

- The existence of a "Code de Bonne Pratique" (pocket-size handbook for the use of the inspectors) which, does not only lay down the principles on which the decisions of the inspectors are to be based, but also gives for each item the reference decisions.

The following is an extract from the "Code de Bonne Pratique" and gives the fundamental principles of the document.

Single Perforation

- To draw the vehicle owner's attention to the condition of one or several items that do not endanger the safety of the vehicle at the moment the inspection is carried out, but on which the vehicle owner must nevertheless keep a close eye;
- To draw the vehicle owner's attention to any technical requirement that is not met.

A green certificate (normal validity) is delivered.

Double Perforation

When the condition of one or several items endanger the safety of the vehicle or when the vehicle owner cannot prove that his civil liability is covered by a valid insurance policy, a red or green certificate of limited validity is delivered. When a green certificate of limited validity is delivered, the date on which the vehicle must be inspected again depends on the gravity of the detected defects.

A single perforation (when the requirements of the Regulations are not met) can be converted into a double perforation when the defects still have not been repaired when the motor vehicle is inspected again.

A vehicle for which a red certificate was delivered shall only be driven, empty, from the inspection station to the vehicle owner's or repairer's residence (and vice versa) or carry out a road test (before or after it was repaired).

The *standardization* of the decisions with regard to the validity is based on the following principles:

1. **Detection of the Infringements and Defects.**

   The perforation of the compartments of the inspection certificate corresponds to the instructions given in the column "Decisions" of the "Code de Bonne Pratique." The place of the letters N-L or R indicates if the defect is detected for the first time or for the second time (e.g., N-L means N at the first detection of the defect and L at the second detection of the defect).

   A difference is to be made between:

   - *First Detection* – An infringement or defect is detected for the first time.
   - *Second Detection* – The same infringement or defect of the same item is detected for the second time. It stands to reason that this happens:
     - at the next periodic inspection carried out to verify the infringements and defects bearing a single perforation;
     - at the next complementary inspection carried out to verify the defects bearing a double perforation.

2. **Meaning of the Symbols.**

   The infringements and defects are penalized by reading the symbols as follows:

   N = single perforation of the compartment: normal validity (3 months, 6 months or 1 year);
   L = double perforation of the compartment: limited validity (from 1 to 15 days according to the gravity of the defect – except when another validity is laid down by the Department or has been provided for in the "Code de Bonne Pratique";
   R = double perforation of the compartment: no validity.

3. Application of the Symbols.

N-N = single perforation of the compartment and normal validity of the certificate when the defect is detected for the first time; when the same defect is detected at the next periodic inspection, the single perforation may be repeated.

N-L = single perforation of the compartment and normal validity of the certificate when the defect is detected for the first time. When the same defect is detected at the next periodic inspection, the single perforation is converted into a double perforation and the validity of the certificate is limited. It stands to reason that when the defect is still present at the next complementary inspection, the validity of the certificate will be annulled.

L-R = double perforation of the compartment and limited validity of the certificate when the defect is detected for the first time; when the defect is still present at the next inspection (complementary inspection), the certificate is annulled and bears a double perforation.

When the same defect is detected twice, the normal validity with single perforation is automatically reduced and the document bears a double perforation (except the cases provided for in the column "Decisions") and the limited validity with double perforation will automatically be annulled.

4. Borderline Cases.

- The "Code de Bonne Pratique" gives some rather frequent infringements and typical defects (opposite to the symbols with regard to the decisions to be reached).
- When the inspector encounters one of the defects mentioned by the "Code de Bonne Pratique," he only has to apply the recommended decision.
- When the inspector encounters an infringement or defect that is not mentioned by the "Code de Bonne Pratique," he only has to compare its degree of gravity to that of the different borderline cases and to infer the decision to be reached. *In case of DANGER the decision is always R.*
- We must lay stress on the fact that this document must standardize and facilitate the inspection. In duly justified cases the inspection station managers may depart from the rules laid down in the "Code de Bonne Pratique," on the understanding that they do not start the habit of doing so, as otherwise the standardization would be impaired.

- The standardization of the inspection apparatus. Before coming into general use in the inspection stations one or two specimens of the new apparatus are tested at a laboratory, as well as at an inspection station.
- The organizing of periodical meetings (at intervals of 4 to 6 weeks) attended by the managers of the inspection organizations, as well as by the competent officials.

  During most of these meetings, the manner in which the Regulations are to be applied, as well as the inspection criteria, are examined.
- The managers of the inspection organizations are obliged to visit all their inspection stations at least once a week.
- Each inspector is in possession of the compendiums of requirements and *interpretative circulars*, as well as the *practical directives.*

  The bringing up to date of the above-mentioned compendiums is centralized and thus standardized.

Compulsory Measures

In Belgium – The Belgian Regulations (article 24 of the Royal Decree of 15.3.1968) lay down:

"§1. No motor vehicle subjected, by virtue of article 23, to the technical inspection, shall be driven on the public way when it is not provided with an inspection certificate that is suitable to its use and still available.

"No motor vehicle subjected, by virtue of article 23, to the technical inspection and for which a red inspection certificate was delivered, shall be driven on the public way, except to cover, empty, the distance from the inspection station to the owner's or repairer's residence and vice versa.

"§2. The inspection certificate shall be produced at any demand of qualified people, who are entitled to withdraw the document when they establish an excessive overweight."

Article 26 of this Royal Decree also lays down:

"§1. No motor vehicle shall be driven on the public way when it is not in perfect maintenance and working condition and when it does not meet the requirements of these Regulations.

"§2. It must regularly be checked independently of the periodic inspections carried out by the organizations recognized by the Minister of Transport."

Besides, motor vehicle defects are classified into two categories by the Belgian Regulations:

1. Any slight defect that does not endanger the safety of the vehicle when the inspection takes place, but on which the vehicle owner must keep a close eye, or any requirement of the Regulations that is not met. The inspection certificate has a normal validity.
2. Any defect that endangers the safety of the vehicle. The validity of the inspection certificate is either limited to 14 days or annulled (red inspection certificate) if the vehicle is in a dangerous state when the inspection takes place.

The "Code de Bonne Pratique" (see page 19) also mentions the "slight" defects that still subsist when the next periodic inspection takes place and for which the validity of the inspection certificate will then be limited. The same holds true in respect of all defects for which a certificate of limited validity was delivered and that have not been repaired: a red inspection certificate (prohibition from driving) shall instantaneously be delivered.

The Authorities are notified of any motor vehicle that was not either presented to the periodic inspection for a valid reason, or that was not presented after the delivery of a limited or red inspection certificate. They send to the vehicle owner a questionnaire; when it appears from his answer that he is in fault, action is automatically taken against him.

As to the penalties for infringements in matters of technical motor vehicle inspection, they are different according to the kind of transport, since they are governed by different outline laws.

The penalties are the following:

1. Passenger cars (law of 1.8.1899). The infringements are punishable either with an imprisonment from 1 day to 1 month and a fine from 10 Fr to 500 Fr (indexed) or with one of these penalties. They are doubled when there is repetition of the offense within one year.
2. Motor vehicles used for the transport of goods on one's own account (Decree-Law of 24.2.1947). The infringements are punishable either with an imprisonment from 8 days to 3 months and a fine from 26 Fr to 10,000 Fr (indexed) or with one of these penalties. When the infringement is grave, the judge may also order the seizure of the motor vehicle.

   When the offence is repeated within the next two years, the amount of the penalty shall not be lower than double the penalty that was previously imposed for the same infringement.
3. Motor vehicles used for the transport of goods on account of a third party (law of 1.8.1960). The infringements are punishable either with an imprisonment from 8 days to 6 months and a fine from 50 Fr to 10,000 Fr (indexed) or with one of these penalties.

   When the offence is repeated within the next two years, the amount of the penalty shall not be lower than double the penalty that was previously imposed for the same infringement.

   When the infringement has been duly established, the qualified agents are entitled to impound the motor vehicle (at the vehicle owner's expense).

   The qualified agents are entitled to oblige the driver to unload excess weight (the maximum admissible weight of the vehicle is fixed by the inspection organization and mentioned on the inspection certificate).
4. Public service motor vehicles (Decree of 30.12.1946). Idem as for point 2.

It is regrettable that no penalty has been laid down for manifest frauds. Indeed, the inspectors regularly detect fraudulent repairs made to dupe them. The only possible penalty consists in delivering a certificate that prohibits the vehicle owner from driving; as the inflicted punishment is rather cheap, the responsible people do not hesitate over starting afresh – with impunity!

EEC DIRECTIVE PROPOSITION

This document contains requirements that are similar to the ones laid down in the Belgian Regulations. So, we can read, for instance:

"**Article 4, §1.** The holder of the registration certificate will be held responsible for the submitting of his motor vehicle to the periodic inspection on the date and under the conditions fixed by the services entrusted with the inspection.

"**Article 4, §2.** The inspection does not exempt the holder of the registration certificate from always keeping his vehicle in good working condition.

"**Article 11, §1.** The checks to be carried out are listed in Appendix 1. When the conditions laid down in §3 are fulfilled, a control disc that is similar to the pattern given in Appendix 2, is delivered.

"**Article 11, §2.** At the registration, the control disc will be fixed for the first time on the motor vehicle. At each periodic inspection, a new disc is fixed on the motor vehicle.

"The control disc must be solidly fixed and, if possible, on the rear number plate. If there is any practical difficulty about it, it will be fixed at a place that is easily visible from outside.

"The validity of the control disc expires at the end of the second month following the date of expiration mentioned on the disc.

"**Article 11, §3.** When defects are detected that, although they do not directly endanger road safety, may nevertheless be a danger to traffic, the inspection service will have to fix a maximum delay at the expiration of which the motor vehicle will be checked again in order to make sure that the above-mentioned defects have been repaired. The detected defects, as well as the time allowed to proceed to the repair, are mentioned on a document that must always accompany the motor vehicle. The new control disc will only then be delivered when the repair will have been duly established by the inspection service.

"When the defects present an immediate danger for road traffic, the motor vehicle shall only be driven on the public way to cover, empty, the distance from the inspection station to the vehicle owner's residence or to the workshop. In this case, the defects will also be recorded on a document delivered by the inspection service and that must always accompany the motor vehicle; the control disc will be withdrawn."

From the international point of view, the EEC Proposition also lays down the following requirement:

"**Article 7, §1.** Each member country will consider that a motor vehicle complies with its national requirements in matters of periodic inspection on condition that:

- the motor vehicle was registered in another member country;
- it is provided with the control disc laid down in Article 11, §2;
- the date fixed for the next inspection (and mentioned on the control disc) has not expired.

"**Article 7, §2.** When the Authorities of a member country state that a motor vehicle registered in another member country is not provided with the control disc or that the date mentioned on the disc has expired, they will report it to the Authorities of the member country where the motor vehicle was registered. In this case, the Authorities are entitled to have the foreign motor vehicle inspected and, in case of need, to limit or have the vehicle prohibited from driving until the defect is repaired."

In this communal Regulations project, as in the Belgian Regulations, no provision is made for the criminal frauds of some motor vehicle repairers or sellers who, fortunately and thanks also to technical inspection, are in a minority.

NATURE AND SCOPE OF INSPECTION

The Belgian System

Vehicles to Inspect – See "Legal Provisions."

Items Checked – At the first inspection of the motor vehicle, the following checks are carried out:

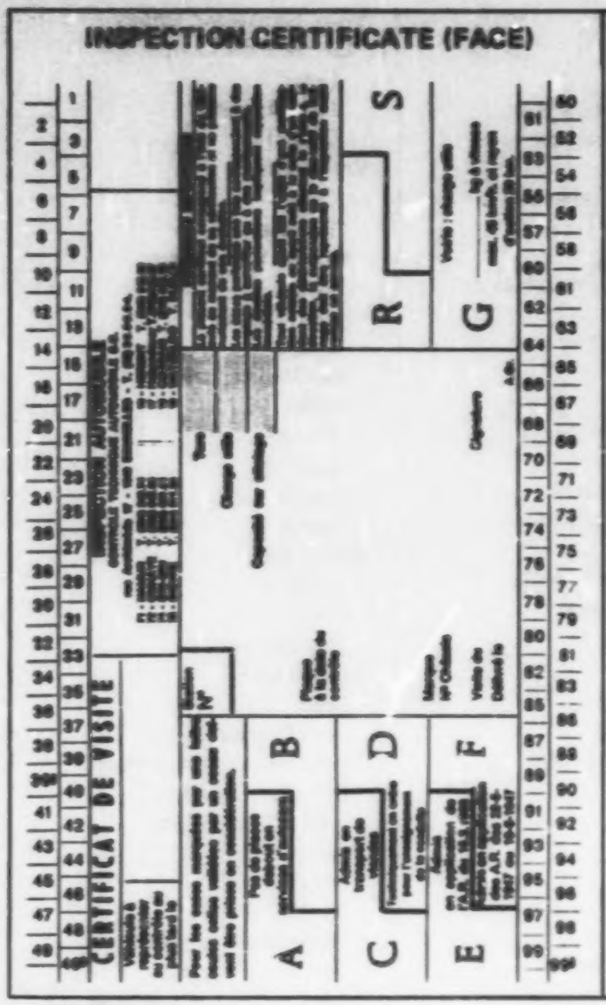
- compliance with the approved prototype,
- compliance with the Regulations,
- examination of the technical condition of the motor vehicle (especially from the point of view of safety).

At the subsequent periodic inspections, *as a rule*, only the technical condition of the motor vehicle is examined.

The items checked have been listed in 7 sections:

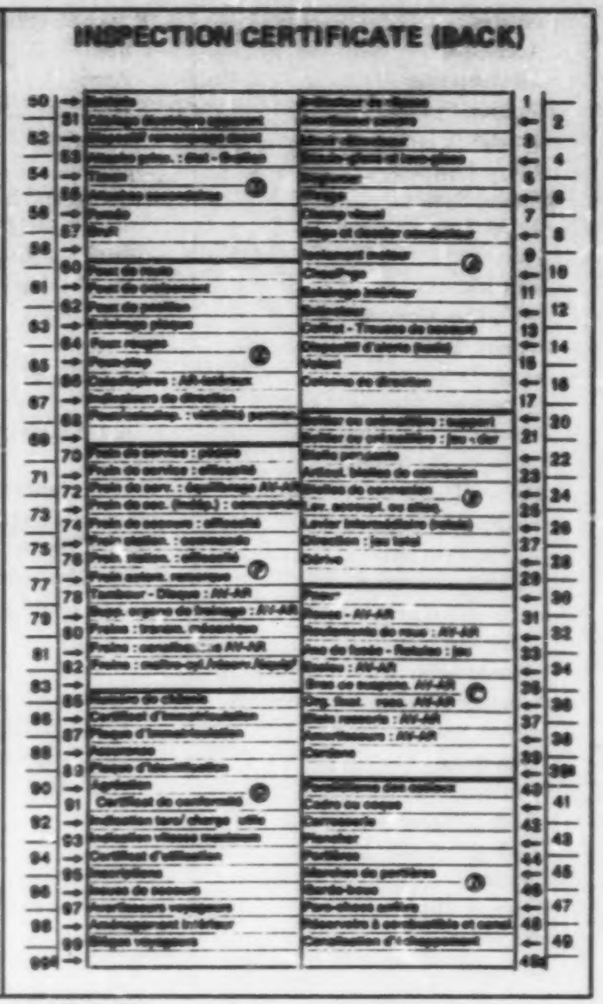
1. Passenger compartment
2. Steering
3. Front and rear axles
4. Chassis
5. Lights
6. Braking equipment
7. Miscellaneous: arrangements for passenger transport, frame number, motor vehicle documents, approval, insurance.

Figures 10a and 10b illustrate an INSPECTION CERTIFICATE on which are listed the items to be checked.



INSPECTION CERTIFICATE (FACE)

FIGURE 10A



INSPECTION CERTIFICATE (BACK)

FIGURE 10B

The following is the United States list of items to be inspected, checked, amended according to the Belgian procedure.

- Audible Signals and Horns
- Braking Systems
  - Emergency
    - Discs
    - Drums
    - Fluid Level (if visible)
    - Force
      - Total
      - Front Axle
      - Equalization
  - Hoses
    - Abrasions
    - Leaks
  - Pedal Reserve
    - Deceleration
  - Parking
    - Actuator
    - Deceleration
  - Service
    - Discs
    - Drums
    - Fluid Level (14) (if visible)
    - Force (%)
      - Total (% of GVW)
      - Equalization (side to side diff.)
    - Hoses
      - Abrasions
      - Leaks
    - Pedal Reserve (proportion or inches of travel)
      - Deceleration (ft/sec/sec)

- Controls
  - Accessible
  - Identification
- Electrical System
  - Battery
  - Inside Lighting
- Exhaust System
  - Leaks
  - Noise
  - Patches
  - Thru Pass. Compartment
- Gasoline Tanks and Lines
  - Crash Protection
  - Leaks
  - Vented
- Glazing
  - Safety Glass
  - Visibility
    - Cracks (inches)
    - Foreign Materials
- Instrumentation
  - Odometer
  - Speedometer
- Occupant Restraint Systems
  - Driver Seat
  - Seat Belts
- Pollution
  - Carbon Monoxide
  - (Diesel) Smoke Opacity
  - Noise
- Rearview Mirrors
  - External
  - Internal
- Steering and Suspension – Visual
  - Inspection of ALL Components
  - Alignment
    - Toe
  - Ball Joints – Unloaded (mils)
  - Binding – Str. Wheel
  - Free Play – Str. Wheel (in.)
  - King Pins
    - (play at meas. point)
  - Power Steering
    - Belts
    - Pump
  - Side Scuff (ft/mi x 10)
  - Shocks (oscillations)
  - Springs
  - Steering and Suspension
  - Wheel Bearings
  - Wheel Tracking
- Tires, Wheels, Rims and Axles
  - Connections
  - Damage
  - Repairs
  - Size
  - Thread Wear (in.)
  - Type
- Vehicle Identification
  - Registration Certificate
  - Serial Number
- Visual Signals and Lamps
  - Directional Lamps
    - Color
      - Front
      - Rear
    - Lens Damage
- Hazard Warning Lamps
  - Color
    - Front
    - Rear
  - Flash Rate
  - Lens Damage
  - Output
  - Visibility Distance
    - (ft x 100)
    - Front (ft x 100)
    - Rear (ft x 100)
- Read Lamps
  - Series/Type
    - AIM V
      - H
    - Output (CP)
- Visual Signals and Lamps
  - License Plate Lamps
    - Color
    - Lens Damage
    - Output
- Reflectors
  - Color
  - Damage
  - Reserve Front Lamps
    - Color
    - Lens Damage
    - Output
  - Side Marker Lamps
    - Color
    - Front
    - Rear
  - Lens Damage
  - Output
- Stop Lamps
  - Actuator
  - Color
  - Lens Damage
- Tail Lamps
  - Color
  - Lens Damage
- Windsheild Clearing Devices
  - Defog and Defrost
    - Area Cleared/Time
- Wash and Wipe
  - Area Cleared
  - Arm Tension
  - Blade Deterioriation
  - Frequency (speed)
- Inspection Frequency/Type
  - Periodic (per year)
  - Re-Sale
  - Post-Accident
- Inspector Skill Tests
  - Performance
  - Written
- Body (Doors – Flooring)
- Fire Extinguisher
- Insurance

Performance of the Inspection – Equipment – The checks are carried out in 57 inspection stations equipped with inspection lanes, most of which are standardized (they total up to 170). Both at the entry and the exit there are waiting areas.

To reach the inspection station, the vehicle owner has to cover to a maximum 20 km, but most of them cover a much shorter distance.

The implantation conditions, as well as the conception of the inspection stations, are examined by the managers of the recognized motor vehicle inspection organizations in cooperation with the Authorities.

To coordinate their action, and especially in order to standardize the equipment, the recognized inspection organizations resolved themselves into a non-profit-making association: the "Groupement des Organismes de Contrôle Automobile" (GOCA). This association examines, in cooperation with the Authorities, the new measures that are to be taken in matters of equipment, inspection methods and criteria ("Code de Bonne Pratique" – see page 117).

The inspection lanes (the average length of which is about 40 m) are equipped with the following apparatus:

- a pit – its length varies according to the motor vehicle categories,
- in each pit – one or two hoists with a pneumatic or electrical control,
- a wheel alignment tester to measure the lateral slipping of the tires on the ground,
- a device to determine the aim and intensity of the headlamps,
- a brake testing machine to measure the brake effort of each wheel – most of the inspection stations are equipped with plate brake testing machines, but the new ones are equipped with roller brake testing machines,
- the pits are progressively equipped with "wheel-shakers" which enable the inspector, who stands in the pit, to shake without any help, the wheels transversely and longitudinally.

Each inspection station is also equipped with:

- a weighing bridge to determine the useful load,
- at least one infrared-beam analyzer to measure the CO,
- at least one smoke density meter for Diesel engines,
- a sound level meter and a tachometer,
- a device to measure the toe-in of driving wheels,
- the devices required to gauge and to examine the apparatus.

Candelameter prototypes to measure the intensity of lights other than headlamps, as well as devices to check the suspension damping, are actually put to the test.

The average total time required for a periodic inspection of a motor vehicle follows:

- 20 minutes for passenger cars,
- 25 minutes for goods vehicles,
- 35 minutes for buses and motor coaches,
- 14 minutes for trailers.

All these checks are carried out without dismantling any part of the vehicle. Some dismantling is nevertheless obligatory for some imported secondhand vehicles.

For doubtful secondhand vehicles, as well as for damaged ones, more thorough procedures are under consideration.

International Motor Vehicle Inspection Committee (CITA)

The "International Motor Vehicle Inspection Committee" is composed of delegates from 17 countries and has prepared a list of the items which it considered should be included in a periodic vehicle inspection. This list has been unanimously approved by the members (see page 117).

From the international and communal points of view this document is a handsome contribution to the evolution of periodic motor vehicle inspection. This document was used for drafting the above-mentioned EEC Directive Proposition.

The document prepared by the International Motor Vehicle Inspection Committee consists of:

- an introduction that defines the basic principles of periodic motor vehicle inspection,
- a list divided into three sections:
    1. the list of items to be checked (decimal notation),
    2. the method of inspection recommended for each item,
    3. the principal reasons for rejection for each item.

The document will be presented to the W.P. 29 of ECE in Geneva as a substitute for the list prepared in 1969 by this organization.

The nomenclature of the equipment corresponding to the list prepared by the International Motor Vehicle Inspection Committee is under consideration.

TYPE APPROVAL AND DEFECT RECALL PROGRAMS

Belgian Type Approval

Field of Action – Mopeds, motorcycles, motor tricycles and quadricycles, as well as any chassis type or monopiece motor vehicle built or assembled in Belgium, or imported into Belgium and intended for use, must be approved.

According either to their assignment or construction, some motor vehicles must not be approved.

Rules of Approval Procedure – The request for approval (formulary delivered by the Ministry of Transport) must be introduced by the motor vehicle manufacturer or his mandatory agent in Belgium, when the former resides abroad. The request must be signed by someone who is technically competent to involve the responsibility of the factory.

Beforehand, the manufacturer must have been recognized as qualified. The depositing of the signatures of the persons entitled to involve the manufacturer's responsibility is required.

The above-mentioned formulary gives a detailed technical description of the motor vehicle units, and the requisite designs are also annexed to it.

For the motor vehicle chassis, the maximum admissible weight of the vehicle as well as the capacity of each axle or the capacity on the pin in the case of a semitrailer is given.

For a motor vehicle to which a trailer or semitrailer can be adapted, the maximum admissible weight of the train must be mentioned on the request for approval.

After the request for approval has been introduced, the vehicle is examined by the "approval service" in order to verify on the prototype the exactness of the particulars given by the manufacturer.

If necessary, some units of the vehicle are dismantled. The compliance of the prototype with the requirements of the technical Regulations and the highway code is also verified.

After the identification, the agent of the motor vehicle maker is informed of the questionable points and, if necessary, is asked for fuller information.

When the detected defects do not constitute a grave infraction of the Regulations, a provisional permit of putting the motor vehicles into use is transmitted to all the inspection stations of the country. For industrial motor vehicles, they also proceed to a technical study of the dossier in order to make sure the units comply with the standards laid down by the Minister of Transport.

Then the certificate of approval is drawn up.

An extract of the document is sent to all the inspection stations. This document will be used for the first inspection of the vehicle. For industrial motor vehicles it will also be used to calculate the useful load.

Penalties for Non-Conformity – For each motor vehicle the manufacturer or his agent must deliver, together with the vehicle, a certificate of conformity stating that the vehicle complies with the approved prototype.

At the first inspection of a motor vehicle at an inspection station, the compliance with the certificate of approval and with the requirements of the Regulations is verified.

When an attempt to defraud is detected, the validity of the certificate of approval will be limited, which produces, as a consequence, the impossibility of putting the motor vehicle into use. When a very grave attempt to defraud is detected, the manufacturer will no longer be recognized as qualified.

This penalty makes it impossible for the manufacturer to sell motor vehicles of his make in Belgium any longer.

EEC Directive Proposition

Article 6 of the above-mentioned document closely bears upon the present subject and lays down:

> "Without prejudice to the obligations incumbent on the motor vehicle manufacturers to eliminate any defect that might endanger road safety and that would have revealed itself after the vehicle type was approved, the member countries will take the necessary measures to inform the manufacturers or their agents of any anomaly that would repeatedly be detected at the periodic inspection."

PERIODICITY OF INSPECTION

We have already set out the reasons why the periodic motor vehicle inspection is quite necessary and why we should also introduce the inspection of motor vehicles that pass into someone else's possession or that have had an accident and of which the items affecting road safety were damaged (see "General Remarks," which also shows that the EEC Directive Proposition develops the same opinion).

Let us hark back to our subject – the periodic motor vehicle inspection. Two questions crop up:

1. When should the periodical cycle start?
2. Which should be the periodicity of this cycle?

Since wear essentially depends on the use that is made of the motor vehicle, it seems quite logical to admit that the answers to these two questions should be given in "kilometers." But, for obvious reasons (especially the opportunities for fraud), no country that has adopted the technical inspection, applies this principle. "Time" is thus the only remaining factor.

Let us examine question 1. The Belgian legislation lays down that vehicles that do not pass into someone else's possession are to be checked for the first time when they are 4 years old. This decision gives rise to many difficulties: vehicles that have been driven for 4 years are refused because they do not comply with the requirements of the Regulations – bodies are rusted to such an extent that they cannot be repaired, etc. The Authorities that were fully aware of the gravity of the problem, tried to subject to the inspection *all* motor vehicles that are put into use for the first time. Unfortunately, under the pressure of motor vehicle manufacturers, they had to give up this project for the passenger cars.

Besides, we must also lay stress on the new task motor vehicle inspection was recently entrusted with: the protection of the environment. But, the risk for pollution (CO and Diesel smoke) and for excessive noise is always present, whatever the motor vehicle age may be. Thus, the inference speaks for itself.

What about the periodicity?

In the Belgian system there are three kinds of periodicity:

- 3 months (buses and motor coaches)
- 6 months (utility vehicles)
- 1 year (passenger cars over 4 years old)

How to explain this differentiation? As a matter of fact, it almost results from a tradition.

It is only logical that we should check more often vehicles such as buses and motor coaches, which generally cover larger distances and carry a larger number of passengers than the other motor vehicle categories.

But, many passenger cars cover larger distances than goods vehicles. More and more people drive to work. Weekends are longer and longer and people more and more want to travel over the borders.

Which is the optimal inspection periodicity? In the first place it depends on the infrastructure a country has or wants to realize. When the country has some means at its disposal, the inspection periodicity can depend on the wanted safety degree.

We must also lay stress on the fact that the carelessness of the vehicle owners is an almost constant factor. So, with the Belgian system, every year about 25 percent of the motor vehicles are rejected at the periodic inspection (these vehicles are to be inspected again). This percentage could of course be brought down if motor vehicles were checked more often, but this would entail larger expenses on the vehicle owner.

As to the damaged cars, the Belgian principle, that takes as a basis the repair costs, is not satisfactory. Indeed, vehicles with a market value below the one laid down in the Regulations are not notified by the insurance companies, although the check of these motor vehicles, after repair, would probably be most necessary. The only good solution would consist in drawing the attention of motor vehicle inspection on any vehicle of which the parts are damaged that directly affect its safety. But this implies that the experts of the insurance companies are entitled to do so. We must recognize that in this field, too, in a lot of countries the legislation is at fault. Besides, a close cooperation from the insurance companies is also indispensable. In our country we did not obtain this cooperation in spite of sustained efforts.

Institutions in Charge of Inspection

TYPE AND STATUS

In Belgium ten recognized organizations, that were selected by the Minister of Transport, are entrusted with the inspection.

The recognized organizations are fully neutral and independent; both factors are the *essential conditions governing their integrity*. Any activity but motor vehicle inspection is prohibited for the recognized organizations. They are also interdicted from having an interest in any activity connected with motor vehicles. These requirements also apply to the staff (see page 16, details of the requirements).

A well-defined inspection area is conferred to each recognized inspection organization. The vehicle owner *has to* submit his motor vehicle to the inspection organization he depends on (according to his residence); yet, exceptions to the rules are made, e.g., motor vehicles used in another inspection area.

The vehicle owner does not have to go more than 20 km to reach an inspection station, as we have already said, this distance is generally much shorter. The ten inspection organizations possess 57 inspection stations (170 inspection lanes) for which the equipment is standardized. Page 25 gives a description of the inspection equipment.

The Ministerial Decree of 23.12.1970 contains the juridical statute of the recognized organizations (see page 16).

At the request of the Administration, the recognized organizations resolved themselves into the non-profit-making association, "GROUPEMENT DES ORGANISMES DE CONTROLE AUTOMOBILE" (GOCA). The main objects of the association are the following:

- The associates cooperate in the performance of technical motor vehicle and trailer inspection, as well as in any study, research or application connected with road safety and intended to improve the inspection methods or the training of the staff.
- The coordination, whenever such is advisable, of the relations between the associates and the ministerial Authorities to which they belong for the performance of the task they are entrusted with.
- The cooperation with all public Powers, within the framework of the Regulations laid down by the Department of Transport, as well as with any organization or person, so long as this cooperation contributes to achieve the aim of the association.
- The temporary care of technical motor vehicle inspection in any area of the Kingdom, in order to secure its continuity (within the framework of the Regulations and requirements with regard to motor vehicle inspection).
- Technical and/or administrative assistance between the associates with the object of helping an associate or his beneficiaries, in order to secure the continuity of technical motor vehicle inspection.

A small sum is raised on each inspection and is assigned to cover the working expenses of the association. This sum is fixed in agreement with the Authorities.

SUPERVISION

The Authorities keep the recognized organizations technically, administratively and financially under strict and total supervision.

Officials of the Ministry of Transport keep a close eye on the activities of the inspection stations and administrative offices.

The accounts are checked by auditors appointed by the Minister of Transport; they have to report to him semiannually. To this end, the accounts, balances and profit and loss accounts are standardized. Besides, a simple and efficient checking system of the incomings is applied.

FEE SYSTEM

As to the inspection fee, the Ministerial Decree of 23.12.70 lays down:

> "**Article 18.** The sums to be raised on the inspection fees in pursuance of the dispositions with regard to the technical requirements that motor vehicles and trailers must meet are fixed by the Minister of Transport in such a way that the amount of incomings of all the motor vehicle inspection organizations laid down in Article 17, cover after eventual help from the "Fonds de prévision et d'utilité publique (Article 25):

"1. the working expenses;
"2. the amortization of the buildings, parkings (not including the ground), office furniture and inspection equipment;
"3. an endowment for the renovation of the buildings, parkings (not including the ground) and inspection equipment;
"4. the share in the "Fonds de prévision et d'utilité publique" (laid down in Article 25);
"5. the share of the motor vehicle inspection organizations in the institutions of public interest mentioned in §2 of Article 16;
"6. the remuneration of the motor vehicle inspection organizations. This remuneration is fixed in percentage of the incomings, after deduction of the expenses mentioned under points 4. and 5."

"**Article 20.** When the annual amount of inspection fees laid down in Article 17 and collected by a motor vehicle inspection organization overdraws the annual total of the amounts of the items defined in Article 18 and charged to the account of the motor vehicle inspection organization according to Article 19, the surplus is to be paid in, within the time laid down by the Minister of Transport, to the "Fonds de prévision et d'utilité publique."

In consequence, the inspection fee does not only cover all the inspection costs and the remuneration of the recognized organizations, but a large part of it is also paid to institutions founded by the State.

One of these institutions is the "Fonds de prévision et d'utilité publique," the main objects of which are the following:

- to cover the eventual deficits of the recognized organizations;
- to further the financing of investments (loans at reduced interest).

We must also lay stress on the fact that the recognized organizations have a commercial constitution and, as we already explained, their remunerations (benefits) are fixed by their statutes. So, they can call up private capitals for further developments (under State control).

The EEC Directive Proposition lays down the following rule with regard to the inspection fees:

"**Article 5.** The inspection fees are borne by the holder of the registration certificate. The inspection fees, according to the motor vehicle category and the character of the inspection, must be identically the same for the whole country and are fixed by the public Powers. The amount of the inspection fees must cover the whole investment and working charges inherent in the inspection."

COLLECTION AND USE OF DATA

The vehicle inspection constitutes a real mine of information that can be used either for national or international purposes. Not only from the technical point of view is this information most interesting for the auto makers, but also from the economic point of view they are very useful.

In Belgium, some statistics with regard to the utility vehicles are drawn up, thanks to the information obtained at the inspection. They bear on the following points:

- vehicle make, type and year;
- tare, useful load;
- motor vehicle category;
- motor fuel;
- coupling;
- kind of body;
- use made of the vehicle; etc.

These data are kept up to date and are conveyed to the computer by the Administration. They are used for economic purposes as well as for the eventual putting into requisition of the motor vehicles by the National or Civil Defense.

Until today, the statistics, with regard to the defects detected on motor vehicles, were drawn up sporadically and manually. The conveying of the data to the computer is being worked out.

Stress must be laid on the fact that, in the present state of things, the statistical tables, with regard to the detected defects that are drawn up by many countries, must be considered very circumspectly. Indeed, as the criteria are not standardized yet, they cannot be compared with the required strictness and that is why their application is very hazardous.

The International Motor Vehicle Inspection Committee (CITA) has gone into the very important question relating to the standardization of the inspection norms and the comparability of the statistics. It stands to reason that, for this Committee, this task is of primary importance and for the benefit of all inspection organizations.

In the past, Belgium got into touch with the auto makers in order to try to determine, by common consent, and taking into consideration their experience, some tolerances with regard to wear and to the inspection standards. But, for a wonder, they were not enthusiastic over the action. Perhaps a communal action from the Authorities will be more successful.

Qualification and Training of Personnel

MOTOR MECHANICS EMPLOYED IN REPAIR GARAGES

Under "General Remarks" we clearly explain why the periodic motor vehicle inspection, however perfectly organized it is, may not alone be responsible for the safety of the motor vehicle and that it was indispensable to bring also the "maintenance" and "repair" under regulation.

Although an efficient obligatory periodic inspection in some degree indirectly results in the elimination of bungling garage mechanics, many others, who are little or not qualified and who often do not have the appropriate equipment, still exist. Besides, the field of action of the obligatory periodic inspection is limited by the fact that the inspection is carried out without dismantling the vehicle.

Therefore, a great responsibility is laid upon the repairer, and when we think of the number of lives lost, we must admit that he plays a chief part in road safety. In many industrialized countries (including Belgium) only a moral responsibility is laid upon the repairer and neither this profession nor the profession of motor vehicle sellers are brought under regulation! (We just learned that in Belgium a Regulation with regard to the profession of garage repairman is under consideration.)

Thus, to secure road safety it is not enough to subject the motor vehicles to the periodic inspection, but the legislation must also lay down some requirements with regard to the organizing of both factors – "repair" and "sale" of motor vehicles.

INSPECTORS AND SUPERVISORS EMPLOYED IN INSPECTION STATIONS

In Belgium the technical staff is graded as follows:

First Category
1st class inspection station manager
2nd class inspection station manager
3rd class inspection station manager
1st class inspection station sub-manager
2nd class inspection station sub-manager

Second Category
1st class inspector
inspector

Third Category
1st class adjunct-inspector
adjunct-inspector

The *"Statutes of the Personnel,"* approved by the Minister, clearly define the duties, tasks and responsibilities of each of the above-mentioned grades.

The Statutes also lay down the qualifications that are required to apply for a post, e.g., a candidate for a post of adjunct-inspector must be a holder of a diploma issued by a technical vocational school of the secondary lower level and have specialized at least one year in motor vehicles. He must also have some years experience in the motor car branch.

The Statutes lay down some well-defined rules with regard to the trial and probation periods.

For instance, a candidate that was engaged as adjunct-inspector must go through a training course at the "Training Center" and sit for an examination; when he passes the examination, he is admitted on probation in the inspection station he was engaged for. At the end of the probation period he has to go through an improving course and only after having passed the final examination does he obtain his appointment to this post.

The same procedure is applied to each promotion stage, e.g., a member of the technical staff engaged as adjunct-inspector will only become a 1st class inspection station manager after having gone through six courses at the "Training Center," each of them being sanctioned by an examination. Besides, he must have given complete satisfaction during the different probation periods and have gained sufficient professional experience in each of the three above-mentioned technical categories.

The matters taught at the "Training Center," as well as its working methods, are laid down in the Statutes, which also define the duties and salaries of the staff.

Additional Considerations

AUTOMATED INSPECTION

The first automated inspection lanes were introduced in Japan with the object of reducing labor by about 30 percent. The main disadvantage of these inspection lanes was the following: each lane was fitted with only one pit, so that the inspection of the underpart of the motor vehicle was superficial (in order to keep up an uninterrupted cadence) and the inspector did not even lift up the front axle.

This is one of the major requirements an automated inspection lane must meet: not to reduce the time needed for the check of the underpart of the motor vehicle, which in fact constitutes the *most important phase* of the inspection. Nor may the automation reduce the time needed for the visual checks that cannot be automated.

The following questions arise: what are the aims of automation – and are they indispensable?

We are of the opinion that the automation is indispensable for many reasons, namely:

- the unceasing reduction of the working time;
- the increasing of the number of inspected motor vehicles that is often more rapid than the development of the infrastructure;
- the alarming rising of the labor cost;
- the search after a greater objectivity of the decisions, all the more as the periodic motor vehicle inspection at present is developing from the international point of view, too.

But to attain to a better efficiency, the automation must be combined with some rationalization. What does that mean?

We must try to obtain an almost uniform filing off of the motor vehicles on the inspection lane. To reach this aim, we must throw out the old ideas; too many checks are carried out with the vehicle on the pit or hoist. We must, on the contrary, divide the inspection in checks, the performance of which requires about the same time.

This principle has been applied in a new Belgian inspection station. They consider a performance time of about 2 minutes (immobilization of the motor vehicle) and the following chain of check points:

- smoke (CO or opacity);
- identification of the motor vehicle;
- lights;
- wheel alignment;
- brakes;
- 2 pits

The result was doubly satisfactory; on the one hand the motor vehicles "filed off" much more easily than in the traditional inspection stations, and on the other hand we noticed a beneficial psychological effect on the motor vehicle owner, who is waiting in a file that is always on the move.

The rationalization must also take into consideration some other points, such as swift and faultless recording of the decisions, vehicles driven on the lane by trained personnel, etc.

Until today, we have not put an automated inspection system to the test in Belgium yet.

VOLUNTARY INSPECTION

As a result of the present inspection system (periodicity and check of the secondhand motor vehicles, as well as of the ones that had an accident) there are almost no voluntary inspections carried out in Belgium any longer.

CONSUMER INTERESTS

It is absolutely certain that the motor vehicle is among the consumer goods to which people attach the most importance, but it is also to the owner himself, as well as to other people, the most dangerous one. Besides, for many people the motor vehicle severely burdens the household budget and sometimes plunges them into poverty (in case of accident).

A good deal of the population is also concerned by the development of the periodic motor vehicle inspection.

That is why we must use every effort (press, radio, TV, prints) to inform and protect the motor vehicle driver and his family.

MISCELLANEOUS

Personnel Work Load (Belgium)

According to their importance, the inspection stations are classified into three categories. The *yearly* *work load* of each inspector is determined according to the inspection station category. The work load that previously took as a basis a well-defined number of inspections, is now determined in "inspection units," in order to differentiate between the different kinds of inspections (passenger cars, goods vehicles, trailers, buses, etc.). The *inspection unit* corresponds to the periodic check of a private car.

PART THREE

FEDERAL REPUBLIC OF GERMANY

General Remarks

Institutions in Charge of Inspection

Qualification and Training of Personnel

Additional Considerations

General Remarks

As early as 1909 a "Law on the Traffic of Motor Vehicles" was enacted in Germany, prescribing official registration for motor vehicles. The implementation regulation to this law, issued in 1910, provides that any application for registration must be accompanied by a certificate of an expert who has been admitted by the senior administrative authority. This regulation already contains an "Instruction on the Inspection of Motor Vehicles," in which among other things the function of those parts of the vehicle which are important for traffic safety is explained. Thus, in Germany the inspection and examination of new vehicles before they are registered for the first time has a tradition of more than sixty years.

The above regulation of 1910 also contains a provision enabling the police to arrange at any time for an inspection on whether the vehicle – that means also such as have already been registered and admitted to road traffic – complies with the construction specifications of this regulation. This provision is the basis for the permanent supervision of vehicles which is still practised today.

Apart from this permanent supervision of vehicles in road traffic, the "Road Licensing Regulations" (Strassenverkehrs-Zulassungs-Ordnung) introduced in 1937 contain in their version of September 24, 1938, for the first time – then still as discretionary clause – the legal basis for the periodical inspection of vehicles by officially authorized experts. These regulations name as the objects of inspection: steering assembly, brakes, lighting, tires, direction indicators, number plates, and the possible emission of noise and smoke. In 1951 this discretionary clause was changed into a regulation for compulsory inspection, the procedure of which in the meantime has been repeatedly improved. One of the most outstanding improvements was the introduction of the official inspection sticker in 1960, which is attached to the vehicle's number plate when the inspection has been successful and which makes supervision in traffic much easier.

The historical development has shown that absolute liberty in the production and the operation of motor vehicles will very soon entail insufficient safety precautions with respect to the vehicle owners or the drivers. This is by no means due to any ill will toward their side, it is rather due to the fact that the stress of personal interests is too powerful for those responsible so that it induces them to abandon any thinking in categories of safety which seems unproductive to them in the first instance.

The linkage of the periodic traffic safety inspections with maintenance services in motor repair shops is unsatisfactory in its result and effect, because this encourages giving certificates with favoritism, as experience shows. The certificate must be made out with absolute impartiality and it must – according to the experience of daily life – be separated in its organization from the car maintenance and repair shops which are dependent upon their customers. The experts and examiners of the Technical Inspection Stations must, therefore, not depend financially upon the outcome of the inspection. The application in practice of this idea in the Federal Republic of Germany entailed the necessity that the Technical Inspection Stations themselves must refrain from any maintenance and repair work in competition with others. The correct execution of the official traffic safety inspections in the Technical Inspection Stations is guaranteed through the supervision by the competent authorities.

LEGAL PROVISIONS, QUALITY CONTROL AND COMPULSORY MEASURES

The legal provisions concerning vehicle inspection at regular intervals have been laid down in a statutory order, the "Road Licensing Regulations" (StVZO-Strassenverkehrs-Zulassungs-Ordnung), which has been promulgated by the Federal Minister of Transport with the approval of the Federal Council (chamber of the Länder of the legislative body). (See page 117.)

According to the provisions of Section 29 of the Road Licensing Regulations the owners of vehicles carrying an official number plate are obliged to have these vehicles inspected at regular intervals and at

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their own expense. The month and year of the next inspection must be indicated on the rear number plate by means of a colored inspection sticker and must also be entered in the vehicle registration certificate.

The details of the kind, the subject, the intervals, and the execution of the inspections, of special forms of inspection, of the proof of the inspection and of the recognition of repair shops and garages are regulated in Annexes VIII and IX to the Road Licensing Regulations (see page), as well as in the directions issued in connection with them (see page 117).

In addition to these compulsory periodical vehicle inspections, Sections 16 to 28 of the Road Licensing Regulations contain further details of the registration procedure of vehicles. Among them are, for example, provisions concerning the prohibition or the restriction of the operation of vehicles not complying with regulations as well as provisions concerning the separate inspection of vehicles that give reason to assume – on the occasion of a traffic control or in an accident – that they do not comply with the regulations. Moreover, the provisions concerning the type approval of new vehicles and vehicle parts as well as of vehicles and vehicle parts that have been modified are also included in the sections mentioned above.

The sphere of quality control comprises the law relating to automotive experts, which contains the provisions concerning the official authorization of experts and examiners as well as the provisions concerning the Technical Inspection Stations and their supervision by the authorities. This law and the relevant implementing regulations ensure an unhampered, objective, and technically unobjectionable execution of the compulsory main inspections by the Technical Inspection Stations (see page 117).

Other measures in the sense of a permanent quality control of the technical inspection are detailed working instructions to the Technical Inspection Stations as well as the comparison of statistical results. A uniform standard of evaluation is set up through an intensive exchange of experience among all inspection stations.

Compulsory measures in the case of violations of the legal provisions are contained in the latter themselves, then in the Penal Code, in the Code of Criminal Procedure, in the Road Traffic Act, and in the law relating to minor offenses. Driving a vehicle whose inspection sticker has expired, for instance, is threatened with a penalty of 250 DM; in addition to that, the competent administrative authority may prohibit the use of the vehicle.

One of the main elements of the German road traffic law is the full responsibility of the owner of the vehicle (and possibly of the person having the right of disposal of the vehicle) that the vehicle complies at any time with the requirements of the provisions laid down by legislation. The inspection system does not release the owner from his liability under the penal or the civil law, but it assists as well as controls him in the performance of his necessary diligence.

NATURE AND SCOPE OF INSPECTION

The essential piece of motor vehicle inspection is the periodic *main inspection*, which is conducted by officially authorized experts and examiners – that means by disinterested and economically independent specialists – in a Technical Inspection Station.

The scope of the main inspection has been oriented to checking the primary roadworthiness of the vehicle and compliance with regulations. The details of the scope of the inspection have been laid down in a direction issued under the Road Licensing Regulations (see page 117).

When compulsory motor vehicle inspection was introduced in 1951, the observance of the periods of inspection was at first controlled by the competent municipal and district authorities (registration offices), by means of card indexes and written summonses to submit the vehicles for inspection. This summons system showed, however, serious drawbacks in the course of time, because the authorities were understaffed and it was difficult to compel those vehicle owners, who had not done so in spite of repeated requests, to submit their vehicles for inspection. In consideration of the great number of such vehicle owners it also was not possible to apply the relevant penal provisions consistently. The result of the summons system in the end was that only 50 percent of the vehicles liable to being submitted for vehicle inspection had really been submitted.

In 1960 these drawbacks were eliminated after the inspection sticker was introduced. The inspection sticker is attached to the vehicle's rear number plate if the inspection has been successful. It allows one to recognize, on the outside of the vehicle, the year by its color and the month of the next compulsory inspection by the way it has been attached to the number plate. The facilitation of the permanent supervision in traffic thus achieved has since led to an almost complete observance of the periods of inspection.

On January 1, 1972, the Technical Inspection Boards in the Federal Republic of Germany had – for the fulfillment of these tasks – altogether 280 inspection stations with a total of 660 test lanes and 562 brake test stands in operation. The installation of 66 more inspection stations with 130 test lanes is planned.

In addition to the compulsory periodical main inspections the following additional inspections are obligatory for certain types of vehicle:

Heavy trucks with a maximum permissible weight of 6 metric tons or more, and all motor coaches and buses have to undergo – owing to their high kilometer performance – periodical *intermediate inspections* in addition to the compulsory main inspections. Trucks have to be submitted for inspection every six months and motor coaches and buses every three months. These intermediate inspections are carried out by officially authorized motor repair shops and consist of a control of the roadworthy condition of the most important vehicle elements, such as brakes, steering assembly, lighting, and tires.

Vehicles of the categories mentioned above also have to undergo a *special inspection of brakes* every year in addition to the main and intermediate inspections (see page 117). Its purpose is a thorough technical check of the braking system, which frequently necessitates the partial disassembly of vehicle parts or the exchange of individual elements. It is for this reason advisable – just as in the case of the above-mentioned intermediate inspection – to combine inspection and repair and so to include repair shops in the inspection system. But also the repair shops carrying out the special inspection of brakes (brake inspection services) require special official authorization. An additional indirect control through the neutral and disinterested Technical Inspection Stations is guaranteed owing to the provision that the special inspection of brakes must be carried out not more than three months before the next main inspection is due.

The prerequisite for the official authorization of motor repair shops and brake inspection services is the employment of qualified, responsible, and certified personnel, as well as the satisfactory equipping of the workshop with machines, tools, etc. (see page 117). Certain conditions are normally attached to the authorization which is subject to constant supervision by the authorities.

In order to further complement the system of the inspections which are due at regular intervals, considerations have been made to the effect that the change of ownership of a vehicle might be reason enough for conducting an inspection.

The study of the transfer of ownership of used vehicles reveals, however, a wide range in the frequency of change of ownership between short and very long intervals. To base motor vehicle inspection only on a change of ownership would not only entail difficulties in the employment of the capacity of the Technical Inspection Stations, but would also result in inspection periods that would be unjustified from a technical point of view. Considerations of the effect of introducing additional inspections when the vehicle changes its owner (over and above the compulsory periods of inspection) revealed that the efforts necessary for these measures would not be in keeping with the actual benefits.

Vehicles that have been considerably damaged in an accident need not be submitted, at present, for an additional main inspection before they are readmitted to road traffic after they have been repaired. On the contrary, they remain, even in such a case, in the same rigid rhythm of the regular inspection periods. Examinations are at present being conducted in the Federal Republic of Germany on whether motor vehicles should – after accidents with a certain, defined amount of damage – be readmitted to road traffic only if they have been submitted for a main inspection after having been repaired. This special treatment of vehicles that have been involved in accidents still meets with considerable difficulties with respect to vehicle inspection. Above all, it will not be possible to find easily and without great effort criteria which would permit a sensible definition of what is dangerous and what is harmless accident damage, and to apply these criteria in practice (see page 117).

TYPE APPROVAL AND DEFECT RECALL PROGRAMS

Every new motor vehicle, before being admitted to road traffic, requires – apart from a few exceptions – official registration, which consists, as a rule, in the granting of an operating permit (vehicle registration certificate) and the issue of number plates. The prerequisite for granting the operating permit is the existence of a decision of an officially authorized expert, in which, as the result of an approval test, the conformity of the vehicle with the construction regulations in operation is proved.

In the German system the "type certificate" (Typgutachten) prevails in the approval tests in conformity with modern large series production. It is the basis for the so-called "General Type Approval" (Allgemeine Betriebserlaubnis). As the necessary tests and examinations for this approval have to be carried out only once for each type of vehicle, they can be particularly strict and extensive and can be conducted by highly qualified specialists – as a rule engineers with university qualification and long experience in vehicle inspection. On account of the special character of series production, the responsibility for the conformity of every vehicle leaving the assembly line with the tested and approved type may then rest with the manufacturer. His own specialized control department as well as random controls made by the supervisory authority guarantee – according to German experience – an unchanged high quality of the new vehicles. Besides, the General Type Approval will be withdrawn if deviations from the type as approved or other defects impairing traffic safety are detected in random checks carried out at the initiative of the approving authority (Federal Office for Motor Traffic Flensburg), or in any other way (police controls, periodical inspection). In order to avert an impending withdrawal of the General Type Approval, the manufacturer will have to prove that firstly the deviations or the defects have been corrected in current production, and that secondly a recall action has been started for the vehicles that have already been delivered. Special proof has to be given of the completeness of this action after it has been finished.

This system has proved a success in the Federal Republic. Although it provides the manufacturers with extensive – and with large series extremely cost-saving – powers and privileges, it imposes grave responsibilities upon them, which in the case of abuse or unreliability will entail extremely severe economic consequences (in the case of a withdrawal of a General Type Approval no vehicle of the type concerned will be newly registered any more; this means immediate unsalability of this type). Another advantage of this system is that the manufacturers have to deal with only one control authority which is highly specialized (a department of the Federal Office for Motor Traffic – Flensburg), which – unlike the great number of inspection stations for the periodical inspection of the vehicles in operation – can concentrate solely upon defects in the construction and the production of new vehicles. This authority works in close cooperation with the Technical Inspection Stations, whose officially authorized experts are competent for drawing up the type certificates.

The operating permit, which by means of an individual certificate can *also* be given for individual vehicles, is the basis for the later periodical inspections of the vehicles in operation. The operating permit contains all essential technical data, on the basis of which the examination of the vehicles as to their compliance with the regulations can be carried out.

Replacement of the national operating permit by the international EEC operating permit is planned for the future. The principle of the operating permit procedure will, however, be retained at the European level.

PERIODICITY OF INSPECTION

The compulsory inspection system in the Federal Republic of Germany is based on prescribed periods of time. Before the inspection on the time basis was introduced, investigations had been made to find out whether a periodical inspection on the basis of the kilometer performance of the vehicles would not be more appropriate. Even if, from the technical point of view, "kilometer periods" would be preferred to "time periods," an inspection system based on "kilometer periods" could not but fail, owing to much more administrative work and much more limited practicability. The main disadvantage – the more difficult and thus less effective coverage of the vehicles – would hardly be made up for by the advantage of the superior technical logic. However, the connection between the average yearly kilometer performance and the rate of wear of the vehicles has nevertheless been taken into account, when the various periods of time for the different inspections have been determined.

The inspection results of many years and special examinations concerning the frequency of defects due to age have led to the introduction of the following periods for the main inspection which have proved adequate in practice:

passenger cars, light trucks, trailers with one axle	2 years
heavy trucks, motor buses and coaches, trailers, and other vehicles of that kind	1 year.

More details on the periods of inspection of the individual vehicle categories can be seen from Figures 4 through 9, pages 7 to 12).

The fact that the average kilometer performance per year of the passenger cars examined decreases with advancing age, as set forth below, has also had an influence on the determination of the periods of inspection:

during the first and second year	18,500 kms per year
during the third and fourth year	12,000 kms per year
during the fifth and sixth year	8,000 kms per year

The evaluation of the inspection results of 1971 according to age categories of passenger cars shows that the percentage of vehicles without any defects decreases from 49 percent with vehicles up to two years old to 18 percent with vehicles that are more than six years old. Conversely, the percentage of the vehicles with considerable defects rises, with the same increase of age, from 24 percent to 56 percent. The proportion of unroadworthy vehicles increases for the said age categories from 0.1 percent to 1.4 percent. It should be concluded from these results that at least vehicles that are more than six years old should be subjected to inspection at shorter intervals.

Considerations aiming at an adaptation of legislation to this realization are being made.

Institutions in Charge of Inspection

TYPE AND STATUS

The organization of German motor vehicle inspection is based on a tradition more than 60 years old of officially authorized experts who, on behalf of the State, as employees of Technical Inspection Stations, carry out the inspection of the vehicles disinterestedly and independently.

The highest Länder authorities have entrusted the following bodies with the construction and the maintenance of the Technical Inspection Stations:

(a) In nine Federal Länder the Technical Inspection Boards (TÜV – Technischer Überwachungs-Verein) are self-governing bodies of trade and industry and have developed from the amalgamated steam boiler operators of about 100 years ago. The Technical Inspection Stations are independent departments of the Technical Inspection Boards.

(b) Two Federal Länder have Technical Inspection Offices (TÜA – Technisches Überwachungsamt), which have been established by the respective competent Land authority within its own organization. These inspection offices form part of the official industrial inspection; they too have independent Techncial Inspection Stations.

In a Technical Inspection Station only such functions may be performed, however, as the experts and examiners have been charged with by law or by the competent Land authority.

The officially authorized motor vehicle expert must be employed in a Technical Inspection Station, which guarantees him the organizational bases for the exercise of his profession and which protects him from liability claims of third parties.

According to the law relating to automotive experts (see page 117), the expert has to do his job with impartiality. He must not be economically dependent upon the number and the results of the inspections.

The expert is personally responsible for the correctness of the technical data in his judgement. The legally effective decisions following from the expert judgement (e.g., the refusal of the operating permit) are taken by the competent administrative authority.

SUPERVISION

The Government of the Land or the administrative body it has appointed determines the local sphere of competence of the Technical Inspection Station. It is not permitted to build and maintain more than one Technical Inspection Station for the same district.

The highest Länder authorities decide upon the organization of the Technical Inspection Stations, issue the technical regulations for the execution of the work of the station, and appoint the head of each Technical Inspection Station and his deputy. Reports on the activities in the Technical Inspection Stations have to be submitted regularly. Besides, the powers of an officially authorized expert or examiner will only be conferred upon them by the highest Land authority after the education and training, as prescribed by the law relating to automotive experts (see page 117), have been completed and an extensive examination has been passed. All this leads to a close and fruitful cooperation between the supervising administrative bodies and the Technical Inspection Station (see page 117).

FEE SYSTEM

The Technical Inspection Station may not run any business for gain. Cost-covering fees are raised in the inspection stations for the inspections and examinations, which have been fixed by way of an ordinance having the force of law issued by the Federal Minister of Transport. The fees raised on account of the activities of the experts and examiners may be used only for purposes in connection with the Technical Inspection Station.

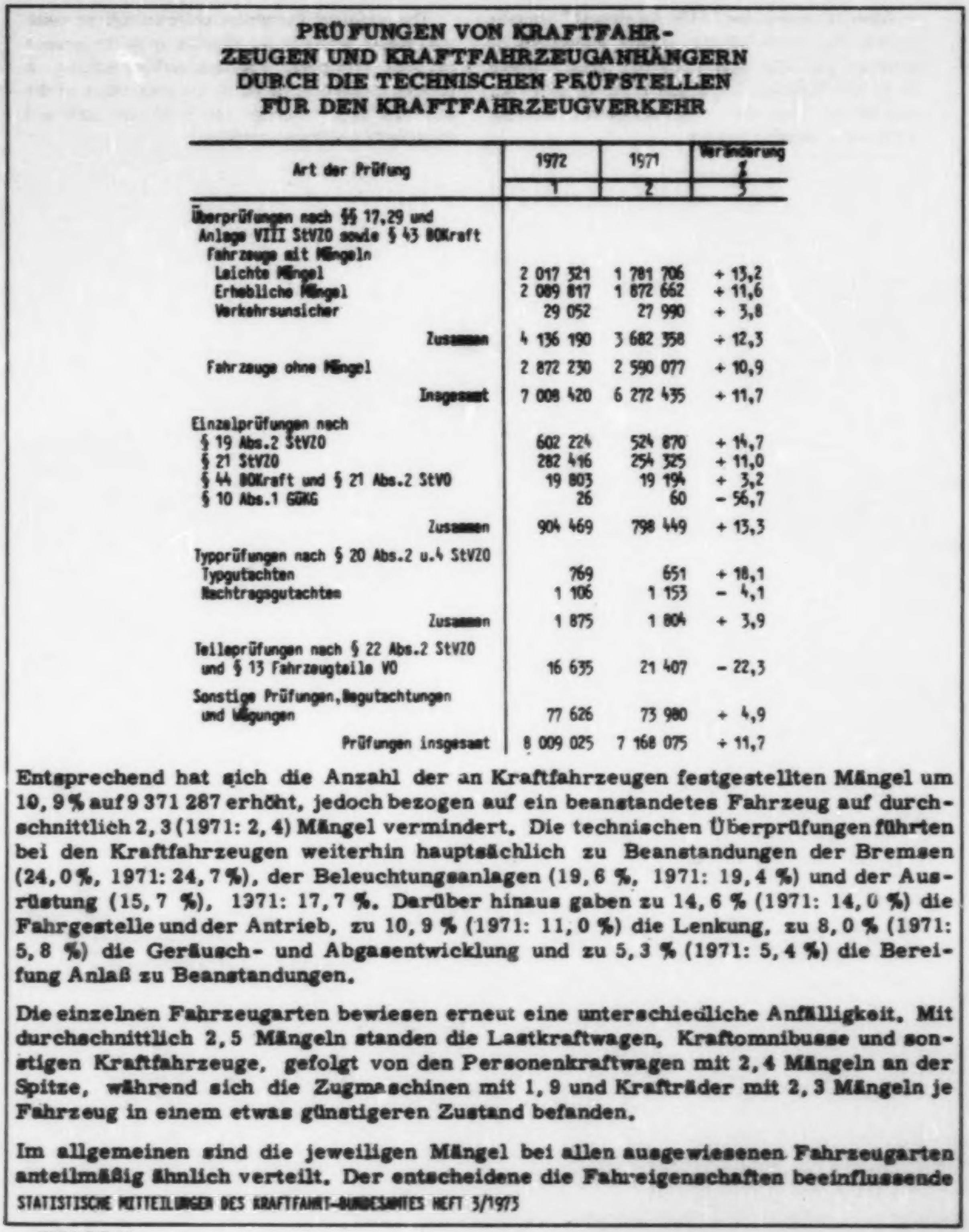
The experts and examiners are paid a fixed salary and are thus economically independent of the number and the results of the inspections.

COLLECTION AND USE OF DATA

The Technical Inspection Stations inform the Federal Office for Motor Traffic – Flensburg at six month intervals of the statistical results of the vehicle inspections and driving tests. There the individual reports are collected, evaluated, and published (see Figures 11 and 12. The press and the radio undertake to regularly inform the general public.

Apart from this, the "TÜV-Autoreport" annually reports the results of the regular inspections of passenger cars. (See page 117.) This report is drawn up by the Technical Inspection Board in their own responsibility as the body competent for the Technical Inspection Stations.

The statistical knowledge obtained will be taken into consideration in the drawing up or the revision of legal provisions. The automobile industry is thereby compelled, owing to the publication of the statistical data, to design and build even safer and more easily maintained vehicles.



PRÜFUNGEN VON KRAFTFAHRZEUGEN UND KRAFTFAHRZEUGANHÄNGERN DURCH DIE TECHNISCHEN PRÜFSTELLEN FÜR DEN KRAFTFAHRZEUGVERKEHR

Art der Prüfung	1972	1971	Veränderung %
	1	2	3
Überprüfungen nach §§ 17,29 und Anlage VIII StVZO sowie § 43 BOKraft			
Fahrzeuge mit Mängeln			
Leichte Mängel	2 017 321	1 781 706	+ 13,2
Erhebliche Mängel	2 089 817	1 872 662	+ 11,6
Verkehrsunsicher	29 052	27 990	+ 3,8
Zusammen	4 136 190	3 682 358	+ 12,3
Fahrzeuge ohne Mängel	2 872 230	2 590 077	+ 10,9
Insgesamt	7 008 420	6 272 435	+ 11,7
Einzelprüfungen nach			
§ 19 Abs.2 StVZO	602 224	524 870	+ 14,7
§ 21 StVZO	282 416	254 325	+ 11,0
§ 44 BOKraft und § 21 Abs.2 StVO	19 803	19 194	+ 3,2
§ 10 Abs.1 GüKG	26	60	- 56,7
Zusammen	904 469	798 449	+ 13,3
Typprüfungen nach § 20 Abs.2 u.4 StVZO			
Typgutachten	769	651	+ 18,1
Nachtragsgutachten	1 106	1 153	- 4,1
Zusammen	1 875	1 804	+ 3,9
Teileprüfungen nach § 22 Abs.2 StVZO und § 13 Fahrzeugteile VO	16 635	21 407	- 22,3
Sonstige Prüfungen, Begutachtungen und Wägungen	77 626	73 980	+ 4,9
Prüfungen insgesamt	8 009 025	7 168 075	+ 11,7

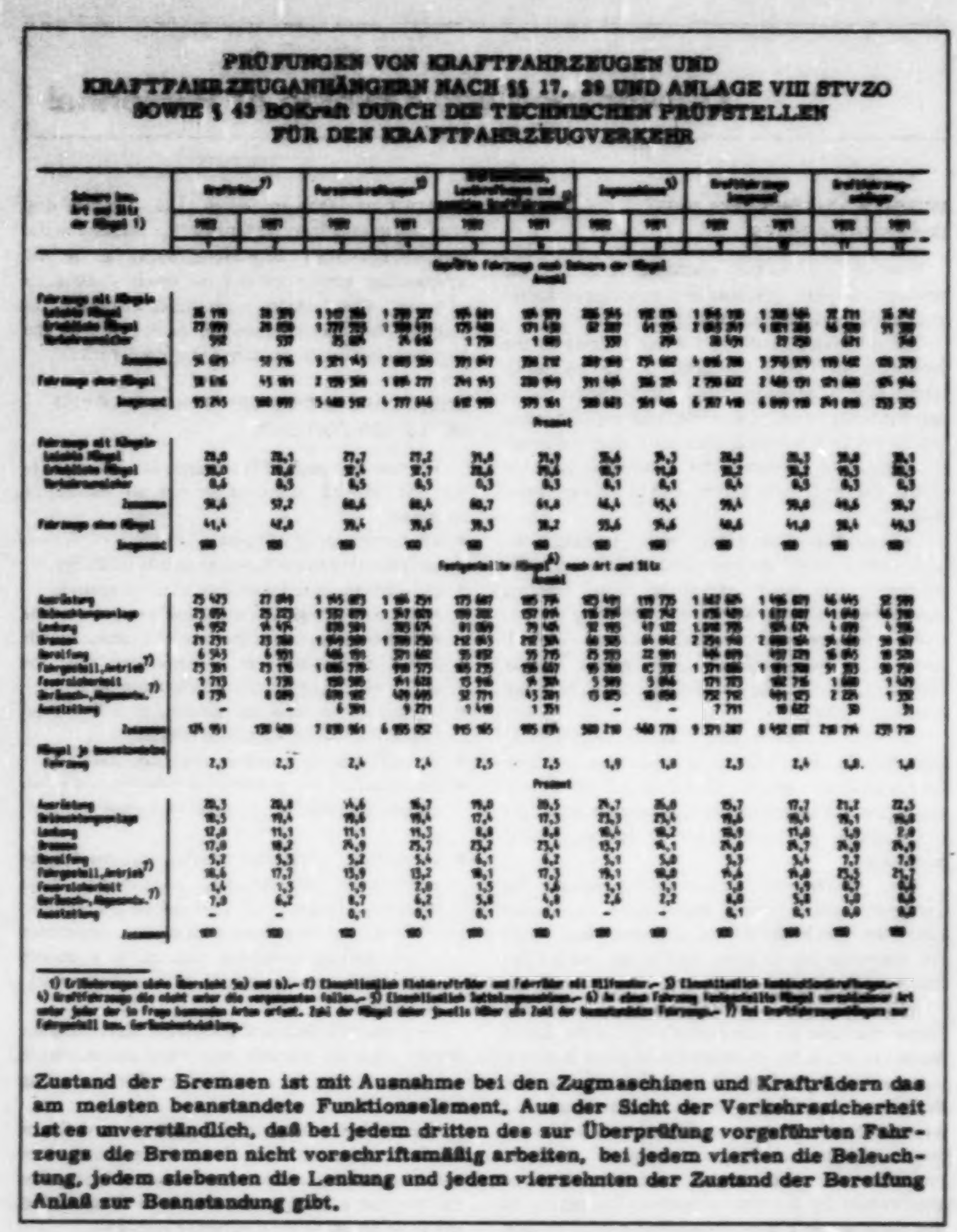
Entsprechend hat sich die Anzahl der an Kraftfahrzeugen festgestellten Mängel um 10, 9 % auf 9 371 287 erhöht, jedoch bezogen auf ein beanstandetes Fahrzeug auf durchschnittlich 2, 3 (1971: 2, 4) Mängel vermindert. Die technischen Überprüfungen führten bei den Kraftfahrzeugen weiterhin hauptsächlich zu Beanstandungen der Bremsen (24, 0 %, 1971: 24, 7 %), der Beleuchtungsanlagen (19, 6 %, 1971: 19, 4 %) und der Ausrüstung (15, 7 %), 1971: 17, 7 %. Darüber hinaus gaben zu 14, 6 % (1971: 14, 0 %) die Fahrgestelle und der Antrieb, zu 10, 9 % (1971: 11, 0 %) die Lenkung, zu 8, 0 % (1971: 5, 8 %) die Geräusch- und Abgasentwicklung und zu 5, 3 % (1971: 5, 4 %) die Bereifung Anlaß zu Beanstandungen.

Die einzelnen Fahrzeugarten bewiesen erneut eine unterschiedliche Anfälligkeit. Mit durchschnittlich 2, 5 Mängeln standen die Lastkraftwagen, Kraftomnibusse und sonstigen Kraftfahrzeuge, gefolgt von den Personenkraftwagen mit 2, 4 Mängeln an der Spitze, während sich die Zugmaschinen mit 1, 9 und Krafträder mit 2, 3 Mängeln je Fahrzeug in einem etwas günstigeren Zustand befanden.

Im allgemeinen sind die jeweiligen Mängel bei allen ausgewiesenen Fahrzeugarten anteilmäßig ähnlich verteilt. Der entscheidene die Fahreigenschaften beeinflussende

STATISTISCHE MITTEILUNGEN DES KRAFTFAHRT-BUNDESAMTES HEFT 3/1973

FIGURE 11



PRÜFUNGEN VON KRAFTFAHRZEUGEN UND KRAFTFAHRZEUGANHÄNGERN NACH §§ 17, 29 UND ANLAGE VIII STVZO SOWIE § 43 BOKraft DURCH DIE TECHNISCHEN PRÜFSTELLEN FÜR DEN KRAFTFAHRZEUGVERKEHR

Zustand der Bremsen ist mit Ausnahme bei den Zugmaschinen und Krafträdern das am meisten beanstandete Funktionselement. Aus der Sicht der Verkehrssicherheit ist es unverständlich, daß bei jedem dritten des zur Überprüfung vorgeführten Fahrzeugs die Bremsen nicht vorschriftsmäßig arbeiten, bei jedem vierten die Beleuchtung, jedem siebenten die Lenkung und jedem vierzehnten der Zustand der Bereifung Anlaß zur Beanstandung gibt.

FIGURE 12

Qualification and Training of Personnel

MOTOR MECHANICS EMPLOYED IN REPAIR GARAGES

Normally, a motor mechanic exercises his profession for the most part in a motor repair garage and has thus a fixed place of work.

The minimum condition for the training in the profession of motor mechanic is the successful termination of primary school. The applicant for an apprenticeship must, if possible, take a qualification test before he is accepted. This test is carried through in cooperation between the vocational guidance office, the trade corporation, and the instructional shop.

During the subsequent basic training, the apprentice is taught the basic skills in iron and metal processing, particularly measuring, filing, bending, straightening, riveting, forging and hardening of plain tools, soldering and brazing, welding, drilling, reaming, thread-cutting by hand, simple turning operations, and testing of materials as is normally done in a workshop.

The total practical training takes 3½ years. During this time, the apprentice attends the classes provided for his profession in a vocational school. There he is taught the necessary theoretical knowledge which the future motor mechanic needs in his many-sided profession.

The journeyman's examination before the competent journeyman's examination committee forms the conclusion of the apprenticeship, where the apprentice has to prove that he has reached the training target.

After five years of professional activity the journeyman may take the examination for the title of master, in which the examinee has to prove that he is in a position to perform all work that may occur in the motor mechanic profession unassisted and in a masterly manner. Special courses are arranged by the master training schools of the motor mechanic profession to prepare the candidates for the examination for the title of master. The passing of this examination is the prerequisite for being entered into the trades and crafts register and thus for the exercise of the trade of motor mechanic on one's own responsibility.

Master mechanics are recognized and employed as responsible examiners with partial competence in the compulsory vehicle inspections, above all in the intermediate inspections and the special inspections of brakes. Their activity is controlled indirectly also through the main inspections carried out in the Technical Inspection Stations for motor vehicles.

INSPECTORS AND SUPERVISORS EMPLOYED IN TESTING STATIONS

The law (see page 117) requires, as a prerequisite for the official authorization as an expert or examiner:

- a minimum age of 24 years,
- mental and physical fitness as well as reliability,
- the driving license for vehicles of all categories,
- practice of at least one and a half years as a motor vehicle engineer or (in the case of examiners with partial competence) as a master mechanic for motor vehicles or electric vehicle equipment,
- training of at least six months in a Technical Inspection Station for motor vehicles,
- the employment in such an inspection station,
- the proof of the professional qualification in an examination held by a public examination board, and
- successfully completed studies of mechanical engineering or electrical engineering at a university, technical or other special college or – in the case of examiners with partial competence – successfully completed training as a master mechanic for motor vehicles or for electric vehicle equipment.

The head of a Technical Inspection Station and his deputy must be officially authorized motor vehicle experts and must be accredited by the supervising authority.

The Technical Inspection Station is, in virtue of the law, responsible for the training and further in-service training of the experts and examiners. For this purpose a chief instructor has to be appointed and to be named to the supervising authority.

In the Federal Republic of Germany the Technical Inspection Stations are in connection with each other via the exchange of experience during meetings of the

Association of the Technical Inspection Boards (VdTÜV – Vereinigung der Technischen Überwachungsvereine). Interpretations of the provisions and special experiences acquired during the course of their inspection activities are exchanged and will be applied later in their practical work.

Additional Considerations

AUTOMATED INSPECTION

The automation of motor vehicle inspection seems expedient and necessary for various reasons:

1. The shortage of personnel forces to rationalize manpower.
2. Automation meets the demand for an objective inspection, as well as that for the standardization of the inspection at all Technical Inspection Stations.
3. The Technical Inspection Stations have to adapt themselves to the state of the art in order to be able to argue on the same level vis-à-vis the automobile industry.

In the Federal Republic of Germany two different systems are being tested at present:

1. The fully automatic inspection with the integrated participation of the vehicle driver, and
2. The partial automation of individual stations of the inspection, where the work of the expert and examiner is facilitated by the largely automated inspection equipment.

With fully automated inspection the application of machinery is greatest. The result is, however, higher rates of throughput and higher savings of personnel than with partial automation. Both systems have chances of success, according to experience so far. The fully automated inspection station can presumably work in an economical way only in very large inspection stations, whereas partly automated inspection will be employed in the smaller Technical Inspection Stations.

VOLUNTARY INSPECTION

The vehicle owner may have his vehicle inspected by an officially authorized inspection organization also at shorter intervals. This "voluntary inspection" comprises, apart from the examination with respect to the vehicle's roadworthiness, also an examination with respect to its economical operation. The Technical Inspection Boards have created departments outside the Technical Inspection Stations for this special kind of vehicle inspection. This service is normally being made use of by the owners of major vehicle fleets, because here individual arrangements concerning the place and the time of the inspections are possible. Compared with the total volume of the periodical vehicle inspections, the number of these inspections is of minor importance.

CONSUMER INTERESTS

The instrument of the compulsory periodical inspection of vehicles by disinterested motor vehicle experts has a favorable effect on the safety of traffic. Vehicle owners are compelled to have the technical condition of their vehicles checked at regular intervals. Vehicles beyond repair will thus be withdrawn from road traffic in good time, which effectively prevents obsolescence of the vehicle population. Owing to the regular periodical inspections, the vehicles conform, for the most part, to the statutory safety and construction regulations.

The interests of the consumers are directly protected by the "TÜV-Autoreport," in which the result of the regular inspections of passenger cars are published, and that is broken down in makes and vehicle types (see page 117). This gives a picture of the general serviceability of our passenger cars. The Technical Inspection Boards further these public relations by the additional regular publication of press releases on interesting and noteworthy subjects of technology and legislation.

As a special service for the consumers, the Technical Inspection Boards have established so-called universal testing installations. In these installations motor vehicles can be thoroughly checked with the latest testing equipment as to their roadworthiness and to economical operation. These installations are often made use of when a secondhand car is bought or sold.

MISCELLANEOUS

The existence of the Technical Inspection Stations has led to the formation of a cadre of impartial and experienced motor vehicle experts, who are available for carrying out important work in the sphere of road traffic. Activities of this kind are, for example, outside the compulsory motor vehicle inspection. Some of these activities are:

- individual tests of vehicles which have been changed in technical respect;
- testing of vehicles for the granting of an operating permit in individual cases;
- testing of prototypes of an intended series production (approval test) for the granting of the "General Type Approval" (Allgemeine Betriebserlaubnis);
- testing of vehicle components for the granting of a "General Type Approval for Vehicle Parts" (Allgemeine Bauartgenehmigung);
- driving tests;
- medico-psychological certificates on vehicle drivers;
- advisory function with respect to legislative measures in the national and international sphere;
- statistical recording and evaluation of the test results for the purpose of the determination of effect and success of vehicle inspection;
- function as experts for law courts and public prosecution;
- organization of an extensive exchange of technical experience;
- measures for making vehicle tests and driving tests more objective and thus guaranteeing a well-balanced standard of judgement;
- organization and maintenance of an extensive network of inspection stations and continuous adaptation to the latest state of engineering;
- development of specific testing installations (e.g., roller brake test stands) and setting up rules for their testing, adjustment, and maintenance;
- participation of motor vehicle experts in examinations of driving instructors.

PART FOUR

DENMARK

General Remarks

Institutions in Charge of Inspection

Qualification and Training of Personnel

Additional Considerations

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General Remarks

As early as May 15, 1903, a "Law on the Traffic of Motor Vehicles" was enacted in Denmark, and a revision of this law, dated May 27, 1909, prescribed official registration for all motor vehicles.

The total motor park then consisted of 682 cars and 3,467 motorcycles.

As far back as 1902 the first motor taxi was employed in Denmark, and as growing traffic road accidents started to occur, around 1905 official motor vehicle experts with an engineering degree or other technical training were employed. The job was part time only and was paid by fees according to services rendered.

The job was to assist the local authorities to inspect new and secondhand vehicles that were put up for registration. It also included quarterly inspections of vehicles that were used for public conveyance, inspection of vehicles on the road, as well as supervision of driving tests, and finally examination and issuing of reports in connection with traffic accidents.

By a law of April 29, 1913, these official motor vehicle experts were placed under the Ministry of Justice.

With the subsequent increase of the motor park the demand for more and better qualified motor vehicle experts became evident. At the beginning of the 1930s, the Ministry of Justice consequently established a test commission consisting of one legal and two technical experts.

In order to be appointed a motor vehicle expert under the Ministry of Justice you have to pass a written and a verbal examination. If you pass the test you can obtain an appointment, if there is a vacancy and provided that the Ministry of Justice considers the applicant suitable.

In 1932 "The Ministry of Justice's Directions for Motor Vehicle Experts" were issued. These instructions specify the technical requirements to which the motor vehicle and auxiliary equipment must comply. They still exist – although somewhat altered – as directions for the vehicle inspectors under the Ministry of Justice.

In 1957 the motor vehicle experts, so far having been paid by fees, became Government employees with a fixed salary, and in 1963 the official designation was changed to "The Ministry of Justice's Vehicle Inspectors."

LEGAL PROVISIONS, QUALITY CONTROL AND COMPULSORY MEASURES

Today, the Government Vehicle Inspection is incorporated in a very simplified administrative structure, viz.:

The Ministry of Justice, which means the permanent undersecretary and the assistant secretary is through the 3rd department of the Ministry of Justice the top political and administrative authority. Any requests or demands which other Ministries may have concerning motor vehicles must be negotiated with the Ministry of Justice.

As a technical central authority, the Ministry of Justice has established "Statens Biltilsyn" (The Government Vehicle Inspection), who together with the Ministry of Justice adapt and bring up to date the rules in force for motor vehicles, and who work out the administrative decisions, budgets, projects, statistics, measures for supervision, technical specifications, information, etc.

Moreover, "Statens Biltilsyn" issues certificates of approval for all types of chassis of commercial vehicles, including trailers. This measure is compulsory. Besides, "Statens Biltilsyn" works out standard type approvals for mass-produced vehicles, if the importer wants it (voluntary).

"Statens Bilinspektion" is spread all over the country, which is divided into inspection districts. The districts are conducted by vehicle inspectors under the Ministry of Justice, assisted by office and technical staff (vehicle supervisors).

The whole staff is employed by the Government and paid according to the agreement between Government and the relevant trade organizations.

"Statens Bilinspektion" is a non-profit, independent, and impartial and technical Government institution for the benefit of authorities, law courts

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and the public. The employees are not allowed to carry on any form of business, direct or indirect, which is connected with the motor trade, or which could in the least way influence their work.

Supervision is made by means of statistics and enacted by a traveling inspector. Admission to complaint is open to anybody. If desired, claims can be lodged directly with the Parliamentary Commissoner, and also, the attention of the press, the radio, the TV and the public is constantly turned to the institution.

The work of the vehicle supervisors is subject to frequent spot checks.

Thus, the vehicle inspections on the part of the authorities have always been under Government control. The motor vehicle experts handle the practical work in connection with registration of new vehicles, with periodical inspections of those categories of vehicles being subject to this control, with inspecting secondhand cars, and by supervising the road traffic together with the police, and finally by assisting the police in traffic accidents.

Apart from the purely technical aspects concerning the general condition of registered motor vehicles, "Statens Bilinspektion" also evaluates new passenger cars which are presented for registration and which are not comprised by the standard type approval. This is with a veiw to establishing the size of the registration tax to be imposed by the Government. The same applies to the yearly vehicle taxes, the size of which depends on weight and motive fuel.

The police have a computerized central register for the whole country and issue license plates and currently check the license plates.

If a vehicle is not presented for inspection, if tax or insurance is not paid in time, if a vehicle is found defective or has been seriously damaged in an accident, the police will remove the license plates, and these are returned only when the tax or insurance is paid, or the vehicle has been repaired and subsequently approved by "Statens Bilinspektion."

The Danish Road Traffic Act and the provisions laid down by legislation detail what is demanded concerning the condition of a vehicle and place the responsibility that these rules are being observed with the owner and the driver.

The basis is Section 4 of the Road Traffic Act prescribing:

> "Any vehicle must be and be kept in such a condition that it can be used without undue danger and inconvenience to others and without damage to the roads. Subsection 2. It is the responsibility of the owner or the person (user) who has the car at his constant disposal that the condition of the vehicle is in conformity with the law, especially that steering gear and brakes are safe and sound, that any coupling attachments for trailers, semitrailers or similar conveyances are safe and in good condition, and that signals and designations are all right."

In order to help the owners live up to this responsibility the Ministry of Justice has partly prescribed compulsory inspections and partly given access to voluntary inspections as an assistance supplementary to their own efforts.

NATURE AND SCOPE OF INSPECTION

Denmark has a registered motor park comprising approximately 1,500,000 vehicles, equal to 3.5 inhabitants per vehicle.

At present about 350,000 vehicles are being inspected annually; 250,000 inspections are mainly in connection with registration of new vehicles and transfers of secondhand cars; 100,000 are periodical annual inspections.

As regards inspection of vehicles, the work of "Statens Bilinspektion" is from the start based on inspection of vehicles changing owners. The field of activity also comprises vehicles which have undergone construction alterations, or those which have been fitted with coupling attachments for trailers. Then there are the vehicles which have been severely damaged in traffic accidents and vehicles which have been found dangerously defective, either on occasion of inspections in connection with traffic accidents or in the course of spot checks on the road – the latter being made by "Statens Bilinspektion" in cooperation with the police.

Today, for the majority of mass-produced new vehicles (90 percent) standard type approvals have been issued, which means that they can be registered without inspection, provided that the manufacturer/importer and dealer testify in writing to the motor office that the vehicle complies with the standard type approval, and that the vehicle has been checked and made ready for use by the dealer.

As a measure of supervision, "Statens Bilinspektion" calls in 5 to 10 percent of newly registered vehicles for spot checks by asking the owner to present his car for inspection himself. This is done without the intermediary of importer and dealer. This inspection is free and, besides being a very good consumer protection, these spot checks ensure a constant supervision of the standard type approval system.

As mentioned, standard type approvals are voluntary.

The Ministry of Justice has contemplated instituting compulsory type approvals, partly in order to move the working capacity of "Statens Bilinspektion" to inspections of secondhand cars, partly in order to make it easier for the trade to have new vehicles registered.

The Ministry of Justice has also been working on a joint Inter-Scandinavian system; at present, however, they are awaiting developments within the European Common Market.

For vehicles that are not subject to periodical inspection, inspection is compulsory in case of transfer from one owner to another, provided that the vehicle has not been inspected and approved within the last two years. (This applies to cars which are 5 to 10 years old.) A car registered for the first time more than 10 years ago must have had the last inspection within the last 12 months.

As regards periodical inspection (refer to page 54), certain categories of vehicles, first and foremost taxis, buses, learner cars, self-drive rental cars, as well as fire engines and other cars in official service, must always be presented for inspection before they can be registered, and then these vehicles automatically come up for periodical inspections once a year.

All types of commercial vehicles which are more than five years old are also subject to annual inspection.

In conformity with German and Swedish rules, it has been proposed that Denmark should adopt periodical annual inspection of all categories of vehicles commencing when these are approximately 3 years old.

This complex of problems is at present being dealt with by a traffic safety commission appointed by the Ministry of Justice in which the political parties are represented. This commission has not yet given a final report on periodical inspection. To all appearances, however, the opinion of the members of the commission is divided. One part recommends periodical inspection. The other part at present wants to refrain from extending the inspection organization and recommends instead an increased control on the roads and a larger amount of spot checks of new vehicles which have the standard type approval and which are consequently registered without inspection.

Then, some of the politicians are of the opinion that matters should be kept pending awaiting any provisional orders, which may be issued by the EEC Council of Ministers on the subject of periodical inspection of motor vehicles.

TYPE APPROVAL AND DEFECT RECALL PROGRAMS

The system of type approval is divided into a compulsory and a voluntary part.

Vehicles for Which Approval Is Compulsory

According to the Ministry of Justice's instruction No. 108, dated March 24, 1966, concerning registration of motor vehicles, etc., an approval issued by "Statens Biltilsyn" must be available for the following vehicles submitted for inspection, if they have not been registered in this country before:

- Passenger cars suitable for accommodation of more than 9 persons, inclusive of the driver.
- Vans and commercial vehicles, apart from such as have been previously registered in this country as passenger cars.
- Carrier tricycles.
- Trailers and semitrailers.
- Carrier sidecars, apart from those which are built on frames meant for passenger sidecars.
- Caravans and similar trailers meant for habitation.

This kind of type approval normally only comprises the chassis, and consequently, it is necessary that each factory-finished vehicle is presented for inspection with "Statens Bilinspektion" and is checked and tested on the basis of the type approval.

Vehicles for Which the Standard Type Approval Is Voluntary

According to the Ministry of Justice's instruction No. 108, dated March 24, 1966, concerning registration of motor vehicles, etc., a standard type approval can be issued for the following vehicles:

- Passenger cars.
- Vans and commercial vehicles.
- Tractors.
- Motorcycles.
- Caravans which have worn brakes or no brakes at all.

A condition for issuing a standard type approval is, however, that such vehicles are factory finished in serial production.

However, "Statens Biltilsyn" permits the importer to make certain additions or alterations, i.e., mountings of side flashers, reflectors, partitions, standard bodies, etc.

Of course, the system of type approval has certain advantages. In the first place, it requires less administration and makes it easier and cheaper for the automobile trade to have new vehicles registered, and then the working capacity of "Statens Bilinspektion" can be moved from inspecting new vehicles to the inspection of older ones.

On the other hand, however, the sytem of type approval – enabling the automobile dealers to have new vehicles registered without inspection – requires a very thoroughly organized control system.

Control inspections of new vehicles registered on the basis of type approval statements from importers and dealers show that up to fifty percent are not in order or that the vehicle specifications do not comply with the standard type approval.

"Statens Bilinspektion" then reports the established irregularities to the type approval authority – "Statens Biltilsyn" – who on their part take up the matter with the organizations of the trade and the automobile importer.

Should this course of action prove insufficient to avoid repetitions, "Statens Biltilsyn" can stipulate a time limit within which the importer must have rectified matters, after which the vehicles may once more be called in for inspection.

In case of gross irregularities the standard type approval will be withdrawn, which means that all vehicles of this brand and type cannot be registered in the Central Register of the police without previous inspection of each vehicle by "Statens Bilinspektion."

There are cases where "Statens Biltilsyn" immediately refuses a standard type approval.

In this case "Statens Biltilsyn" informs all vehicle inspection districts of the reasons. This means that the importer and dealer cannot have a single vehicle approved by "Statens Bilinspektion" unless all irregularities found by "Statens Biltilsyn" have been corrected.

In practice the importer normally gives up selling such a vehicle.

For some years it has been contemplated to make the system of standard type approval compulsory for all factory-finished and serial-produced vehicles. It has also been attempted to establish an Inter-Scandinavian, interdependent, system of standard type approval, but at present the result of the considerations taking place within the EEC must be awaited.

PERIODICITY OF INSPECTION

As mentioned, there is no periodical inspection of private passenger cars.

Normally, inspection does not become compulsory until these cars change owners, and even then, only if they are more than five years old.

However, some passenger cars are presented for inspection earlier than that, i.e., if the vehicle has been modified to run on gas instead of petrol; if a trailer attachment has been mounted; or if the car has been damaged or found defective on occasion of a traffic control. Then an increasing number of car owners present their vehicles for voluntary inspection to make sure that the vehicle is in conformity with the law. Cars are also presented before they go to a workshop for repairs so that the owner can obtain a view of the necessary repair jobs. Also, cars subject to transfers are submitted for voluntary inspection.

Thus, for instance, Volvo has made up a "Test Schedule" comprising 56 items, ensuring that all used cars being sold by Volvo dealers have undergone a thorough examination, and defects, if any, repaired.

As an additional check the new owner can, within three weeks after the purchase, submit the car for a voluntary inspection at "Statens Bilinspektion" and obtain a report on the safety condition of the vehicle.

If defects are found, the Volvo dealers engage to effect the necessary repairs free of charge.

Before this "Test Schedule" became effective, all Volvo test mechanics were called to an informatory meeting at "Statens Bilinspektion," where they were acquainted with prevailing rules and the technical criteria according to which "Statens Bilinspektion" judges a vehicle.

Another example is the Royal Danish Automobile Club, according to whose policy and also as a service to the members, the Club pays half of the fee for an annual voluntary inspection with "Statens Bilinspektion."

The periodical inspections comprise:

1. Annual inspection as from the registration date:

   Taxis (including taxi meter control), buses, tourist coaches, self-drive rental cars, learner cars, ambulances, fire engines and all other types of vehicles in official service, low loaders and open-well trailers used for heavy loads.

   Finally, all official cars belonging to Government institutions must be presented for periodical inspection once a year.

2. Annual inspection as from the fifth year after the first registration date:

   Vans, trucks, trailers, semitrailers.

Institutions in Charge of Inspection

TYPE AND STATUS

"Statens Bilinspektion" in Denmark has a tradition of more than 70 years.

The first motor vehicle examiners were employed locally in the counties, but since 1913 the system has been administered by the Ministry of Justice.

Thus, "Statens Bilinspektion" has always been administered by the Government and organized and in practice run by the Ministry of Justice. Since 1960, "Statens Biltilsyn" has acted as the technical/adminstrative intermediary.

Section 75 of the Danish Traffic Act contains the following provisions concerning the vehicle inspectors under the Ministry of Justice:

> "According to the Traffic Act the Ministry of Justice can appoint special motor vehicle inspectors to carry out examinations and tests and to give technical expert advice, when the authorities treat cases concerning motor vehicles."

It is also stipulated that vehicle inspector candidates (qualifying for an engineering degree) are paid according to the wage scale. Having passed the examination and being appointed by the Ministry of Justice to a vacancy, the vehicle inspectors receive the scale salary plus a qualification bonus worked out between the Government (Wage Ministry) and the Association of Engineers (Dansk-Ingeniør-Forening).

Similarly, all other technical/adminstrative personnel draw a fixed salary according to agreement between the Ministry and the organization in question.

All other organizational aspects as regards personnel as well as technical and administrative questions belong under the Ministry of Justice and are laid down in acts, regulations, circulars, etc. "Statens Biltilsyn" keeps up to date a directory for the vehicle inspectors, submits internal memos to the vehicle inspectors, and issues external information to the press, the trade, etc.

SUPERVISION

The Ministry of Justice conducts and administers – partly in cooperation with "Statens Biltilsyn" – the Danish Vehicle Inspection ("Statens Bilinspektion") with a vehicle inspector heading the local inspection districts. Dependent on the size of the districts, there are one or more vehicle inspectors. The test stations employ inspection assistants for the routine inspection jobs and office personnel for booking in, statistics and other office work.

Technical information, specifications, principal decisions, as well as amendments of valid acts and provisions, are continually issued by the Ministry of Justice and "Statens Biltilsyn" to all inspection districts.

FEE SYSTEM

From a financial point of view the Vehicle Inspection is annually provided for in the Budget in the same way as the Ministry of Justice administers courts, police and prison departments.

For political reasons the work of the motor vehicle inspection is nonprofit and exempt from taxes. Consequently, the Ministry of Justice fixes the size of the inspection fees payable in stamps. The inspection fee has just been raised from DKr. 25.00 to DKr. 50.00 and is identical for all sorts of motor vehicles, trailers, etc. The fee normally covers up to another 2 presentations of the vehicle.

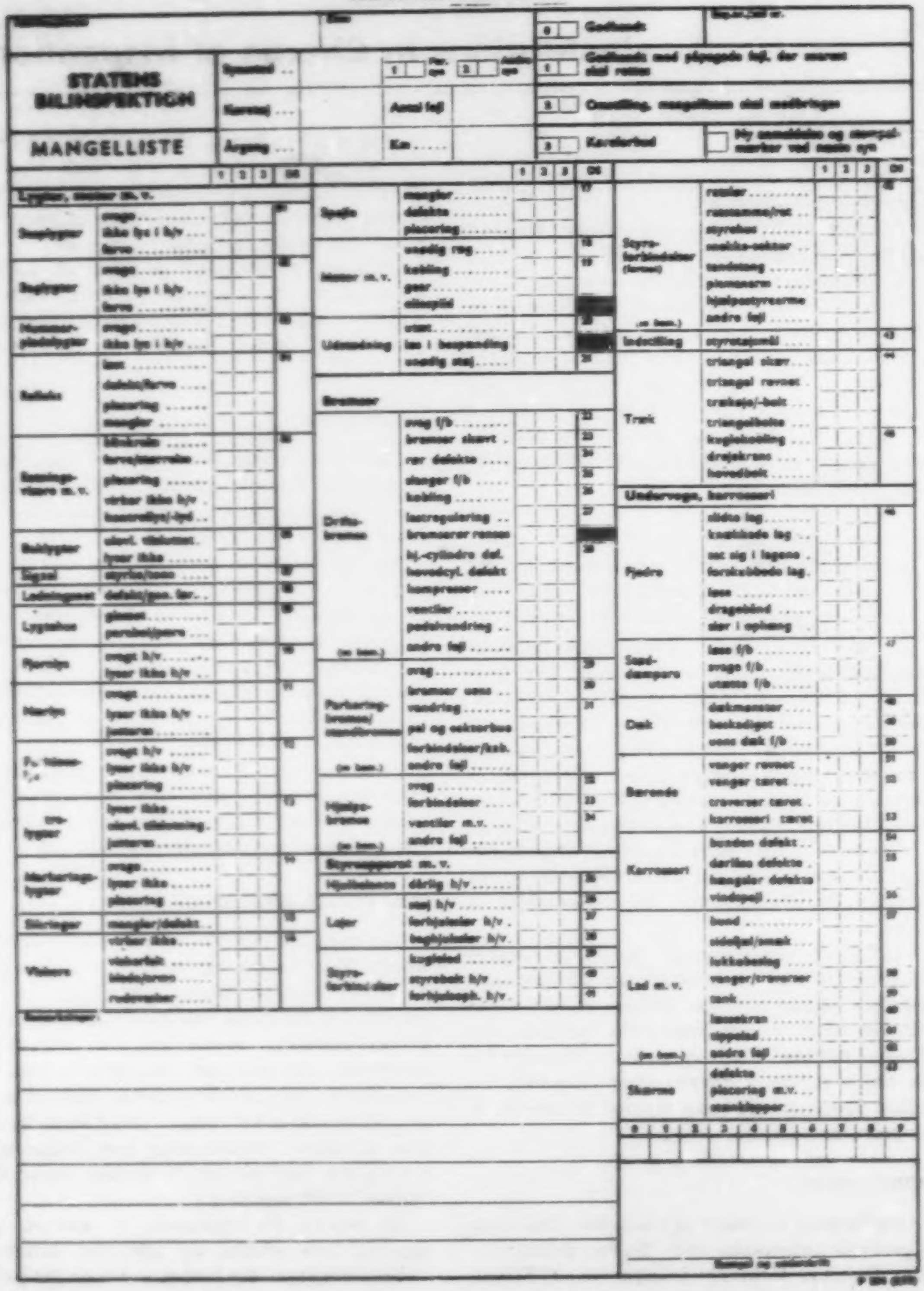
Thus, not only the institution as such but also its employees are not economically dependent on the number of inspections or their results, as well as the effective capacity of the institution in general.

COLLECTION AND USE OF DATA

The inspection districts regularly submit statistical reports. When checking used vehicles, copies are made of every "note of defects" (see Figure 13) and submitted to the Danish Statistics Department, which makes quarterly reports on the number of inspections, defects found, etc. Once a year, the Department issues all the statistical material in the form of a book called "Bilsyn," which states for each type of vehicle: manufacturing year, frequency of defects, and other relevant details. (See extract from "Bilsyn" 1970, page 58.)

All reports on inspections of standard type approved new vehicles are submitted directly to "Statens Biltilsyn" for further action on the part of the importers.

NOTE OF DEFECTS



STATENS BILINSPEKTION

MANGELLISTE

FIGURE 13

Apart from the irregularities which show up in the course of inspections at the test stations, the Danish Statistics Department also receives reports on flaws and defects which have been contributory to or responsible for those traffic accidents for which the police request the assistance of vehicle inspectors in order to help reconstruct the accident.

Likewise, the Danish Statistics Department issues a yearly publication called "Accident Inspections" ("Uheldssyn"). (See extract from "Faerdselsuheld" 1971, page 61.)

In "Uheldssyn" 1971 the following appears:

To "Statens Biltilsyn" are reported technical defects and flaws which have been contributory to or have increased the consequences of a traffic accident, when the reason can be retraced to inferior construction or detail of construction.

This makes it possible to amend current rules and regulations concerning the construction and auxiliary equipment of any vehicle and to stipulate the load limit according to the accidents which actually occur in practice – a field which is of special importance within the various categories of commercial vehicles.

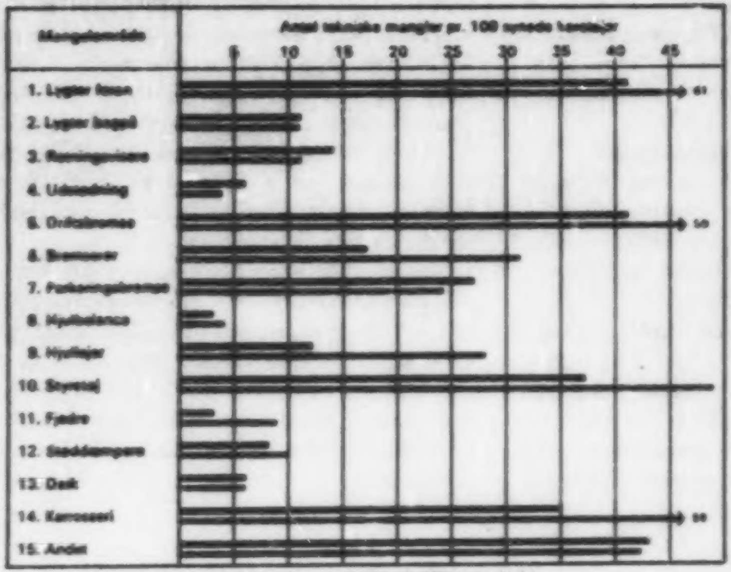
From "Uheldssyn" 1971 it thus appears that the vehicle inspection had 12,751 inspections of vehicles involved in traffic accidents. Of these, 8,684 inspections concerning traffic accidents involving personal injury corresponding to 68 percent of the total amount of the inspections. Considering the fact that the total number of vehicles involved in traffic accidents with personal injury was estimated at 31,265 vehicles in 1971, approximately 28 percent of these cases were inspected. On 10,407 vehicles of the total number of 12,751 inspected in 1971 no technical defects were found. On 2,344 vehicles corresponding to a little more than 18 percent technical defects were found to be accountable for the accident or its consequences.

Technical defects on brakes, tires and steering gear are ascertained relatively often, whereas defects on lights, body, etc., are less often. In this connection it must be taken into account that a crashed vehicle often is in such a condition that it is more or less impossible to trace technical defects with any amount of reliability; for instance, defective lights cannot normally be registered.

EXTRACT FROM BILSYN 1970

Fiat 500/600/850 **Personbiler (fortsat)**

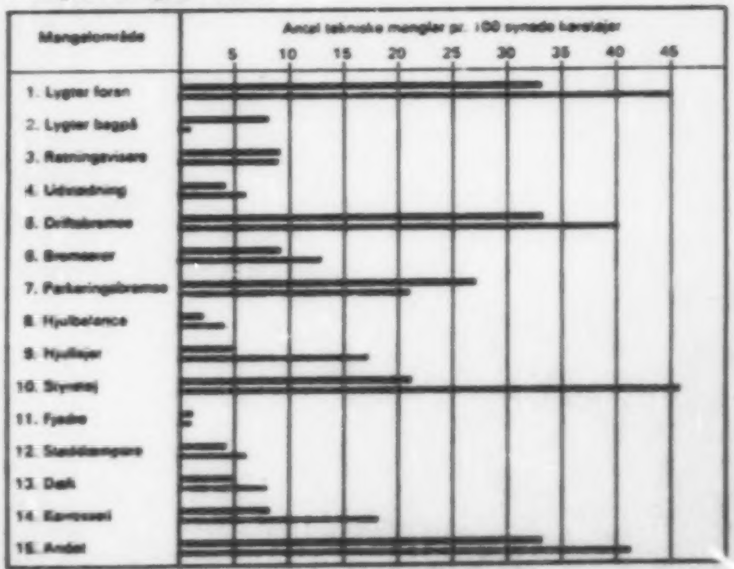
1. registreringsår 1964



▬ = gennemsnitspersonbilen med 1. registreringsår 1964, jfr. tabel I

Syn i alt	814
Synsresultat	
Alvorlige mangler	81,6 pct.
heraf:	
nummerplader inddraget	4,2 pct.
kontrolsyn krævet	77,4 pct.
Andre mangler	11,1 pct.
Ingen mangler	7,3 pct.
Gnstl. antal mangler pr. 100 køretøjer	408

1. registreringsår 1967



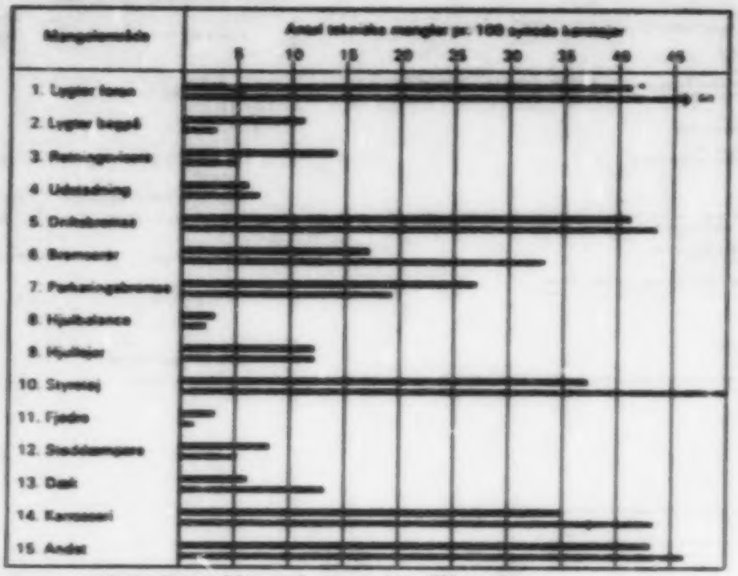
▬ = gennemsnitspersonbilen med 1. registreringsår 1967, jfr. tabel I

Syn i alt	78
Synsresultat	
Alvorlige mangler	66,7 pct.
heraf:	
nummerplader inddraget	– pct.
kontrolsyn krævet	66,7 pct.
Andre mangler	20,5 pct.
Ingen mangler	12,8 pct.
Gnstl. antal mangler pr. 100 køretøjer	276

EXTRACT FROM BILSYN 1970 (Continued)

Fiat 1100 **Personbiler (fortsat)**

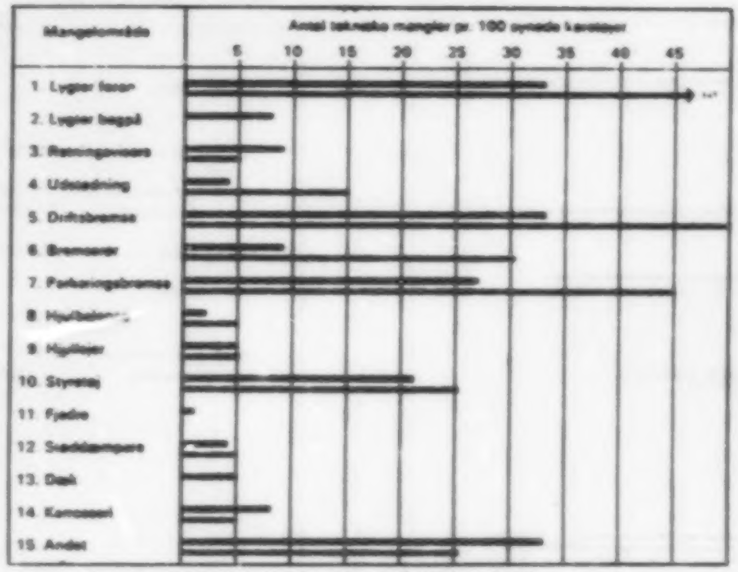
1. registreringsår 1964



—— = gennemsnitspersonbilen med 1. registreringsår 1964, jfr. tabel I

Syn i alt	**129**
Synsresultat	
Alvorlige mangler	75.2 pct.
heraf:	
nummerplader inddraget	3.9 pct.
kontrolsyn krævet	71.3 pct.
Andre mangler	8.3 pct.
Ingen mangler	8.5 pct.
Gnstl. antal mangler pr. 100 køretøjer	**342**

1. registreringsår 1967



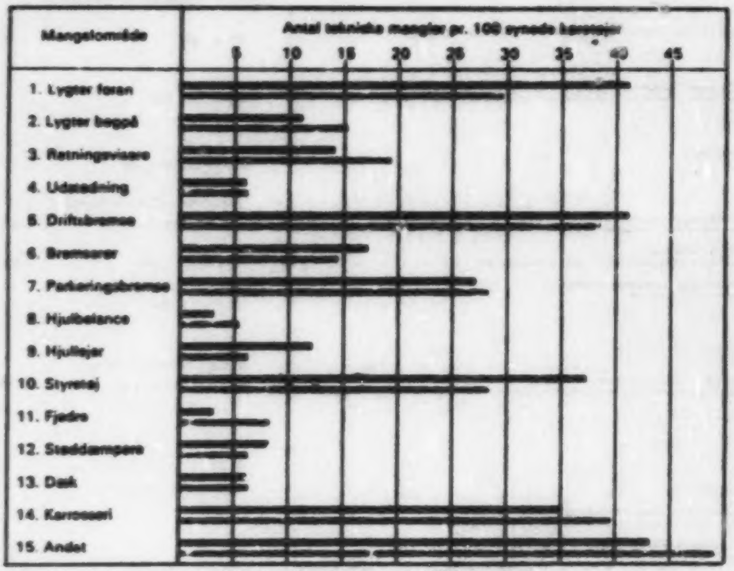
—— = gennemsnitspersonbilen med 1. registreringsår 1967, jfr. tabel I

Syn i alt	**70**
Synsresultat	
Alvorlige mangler	65.0 pct.
heraf:	
nummerplader inddraget	– pct.
kontrolsyn krævet	65.0 pct.
Andre mangler	30.0 pct.
Ingen mangler	5.0 pct.
Gnstl. antal mangler pr. 100 køretøjer	**276**

EXTRACT FROM BILSYN 1970 (Continued)

Opel Rekord **Personbiler (fortsat)**

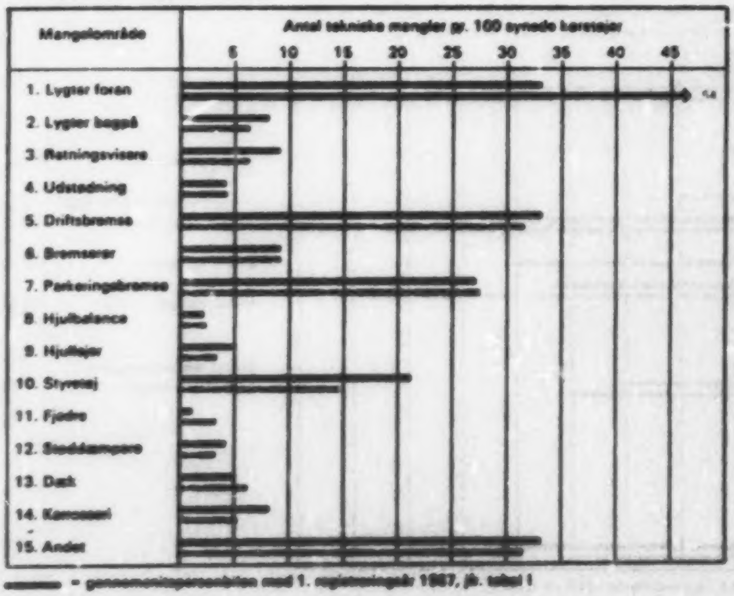
1. registreringsår 1964



▬ = gennemsnitspersonbilen med 1. registreringsår 1964, jfr. tabel I

Syn i alt	887
Synsresultat	
Alvorlige mangler	72,1 pct
heraf:	
nummerplader inddraget	1,0 pct
kontrolsyn krævet	71.1 pct
Andre mangler	18.3 pct
Ingen mangler	9.6 pct.
Gnstl. antal mangler pr. 100 køretøjer	296

1. registreringsår 1967



▬ = gennemsnitspersonbilen med 1. registreringsår 1967, jfr. tabel I

Syn i alt	408
Synsresultat	
Alvorlige mangler	54.9 pct.
heraf:	
nummerplader inddraget	0.5 pct
kontrolsyn krævet	54.4 pct.
Andre mangler	25.5 pct.
Ingen mangler	19.6 pct.
Gnstl. antal mangler pr. 100 køretøjer	304

EXTRACT FROM FAERDSELSUHELD 1971

B. Uheldssyn

I opgørelserne over færdselsuheld med personskade indtil 1967, hvor uheldene blandt andet blev rubriceret efter årsag og eventuelle biårsager, registreredes et mindre antal uheld, hvor det ud fra politiets vurdering af omstændighederne og uheldets hændelsesforløb skønnedes, at tekniske mangler ved de i uheldet implicerede køretøjer måtte betragtes som den væsentligste årsag til uheldet. En tilfredsstillende belysning af eventuelle tekniske manglers betydning for uheldets indtræden eller selve uheldsforløbet kunne dog ikke opnås gennem den anvendte indberetningsform.

Den benyttede årsagsfortegnelse gav således ikke mulighed for en udtømmende redegørelse af det ofte meget komplicerede sammenspil af faktorer, der førte til uheldet, og tekniske mangler ved køretøjer er således kun i mindre omfang registreret som årsag, selv om det eventuelt konstateredes, at tekniske mangler havde været en medvirkende faktor til uheldet eller forøget uheldets følgevirkninger. Ved den fra 1967 gennemførte ændring af indberetningsskemaet for færdselsuheld med personskade, hvor den tidligere benyttede opdeling efter årsager blev forladt til fordel for inddelingen efter uheldssituationer, undersøgtes mulighederne for tilvejebringelse af mere objektivt konstaterbare oplysninger om, i hvilket omfang motorkøretøjer impliceret i færdselsuheld har været behæftet med tekniske mangler af betydning for uheldet.

Problemerne med at opnå en forsvarlig statistisk belysning af de tekniske manglers betydning er dog så omfattende, at det blev opgivet at medtage spørgsmål herom på de generelle indberetninger om alle færdselsuheld med personskade. I stedet valgtes efter drøftelser med Justitsministeriet og Statens Bilinspektion fra og med den 1. januar 1968 at indføre en særlig indberetning om de af bilinspektørerne gennemførte syn af motorkøretøjer, der har været impliceret i færdselsuheld. Disse syn, der foretages på politiets foranledning som led i den efterfølgende behandling og forberedelse til retsinstanserne, omfatter en indgående teknisk undersøgelse af køretøjerne. I de hertil udarbejdede indberetningsskemaer til statistiske formål lægges alene vægt på, om eventuelle mangler kan siges at have været af betydning for uheldsforløbet. I denne vurdering indgår ikke spørgsmål om, hvorvidt køretøjet i øvrigt kunne siges at være i overensstemmelse med færdselslovens bestemmelser.

Danmarks Statistik modtager indberetninger om alle gennemførte syn af motorkøretøjer samt påhængsvogne, der har været impliceret i færdselsuheld og hvor politiet har foranlediget syn af køretøjet.

Det er almindelig praksis, at politiet anmoder om syn af alle motorkøretøjer impliceret i færdselsuheld med dræbte og meget alvorlige personskader. Derudover foranlediges syn af motorkøretøjer impliceret i uheld med betydelige materielle skader og uheld hvor omstændighederne i øvrigt lader formode, at tekniske mangler har været en medvirkende faktor ved uheldet.

Udover oplysninger om køretøjstype, køretøjets registreringsnummer, synsanledning og synssted, anføres om det synede køretøj har været behæftet med tekniske mangler, der på grundlag af de i øvrigt foreliggende oplysninger om selve uheldet, må antages at have haft indflydelse på uheldets hændelsesforløb, idet der skelnes mellem mangler som har været stærkt medvirkende faktor til uheldet og mangler som har været mindre medvirkende. Endvidere anføres, om konstaterede mangler ved køretøjet eventuel har medført en forøgelse af uheldets følger. Som allerede nævnt anføres derimod ikke konstaterede mangler, der alene vedrører færdselslovens bestemmelser, og som ikke har haft betydning i relation til det færdselsuheld, der har givet anledning til teknisk undersøgelse af køretøjet. Således vil for eksempel mangler ved dæk i form af utilstrækkelig slidbanemønster, ikke registreres som teknisk mangel ved uheld, hvor dækkenes tilstand ikke har haft indflydelse på uheldets hændelsesforløb eller uheldets følgevirkninger.

I modsætning til bilsynsstatistikken, hvor konstaterede tekniske mangler ved synede køretøjer ved registrerings- og periodiske syn indberettes ret detailleret, blandt andet med nærmere angivelse af manglens tekniske art, indberettes der ved uheldssyn alene, ved hvilke køretøjsdele manglen er konstateret.

Der gennemførtes i 1971 i alt 12751 syn af køretøjer impliceret i færdselsuheld mod 12399 i 1970, heraf vedrørte 8684 syn køretøjer impliceret i uheld med personskade mod 8498 i 1970, svarende til henholdsvis 68 pct. og 69 pct. af samtlige gennemførte syn. Sammenholdt med oplysningerne om det samlede antal motorkøretøjer impliceret i færdselsuheld med personskade, der inklusive traktorer, motorcykler og knallerter er opgjort til 31265 køretøjer i 1971 mod

Tabel 28. Syn af køretøjer impliceret i færdselsuheld fordelt efter uheldets art og synssted 1971

	I alt		Personbiler	Busser	Varebiler[1]	Lastbiler[2]	Traktorer	Motorcykler	Påhængsvogne	Andre køretøjer[3]	Uoplyst
	1970	1971									
Antal syn i alt	**12399**	**12751**	**9227**	**76**	**1321**	**718**	**77**	**386**	**186**	**674**	**86**
Syn i anledning af uheld med:											
Personskade	8498	8684	6090	60	861	503	56	343	120	605	46
Alene materiel skade	3756	3919	3039	15	445	210	21	39	63	58	29
Anledning uoplyst	145	148	98	1	15	5	–	4	3	11	11
Synssted:											
Uheldssted	1408	1553	857	31	148	265	35	35	88	85	9
Synshal/værksted	5210	5966	4565	20	617	246	13	163	47	258	37
Andetsteds[4]	5781	5232	3805	25	556	207	29	188	51	331	40

[1] Indtil 3000 kg totalvægt. [2] 3000 kg totalvægt og derover. [3] Incl. knallerter. [4] Omfatter fortrinsvis stærkt havarerede motorkøretøjer, der transporteres til syn ved politistationer m.m.

30766 i 1970, synedes i 1971 knap 28 pct. af de i uheld med personskader implicerede motorkøretøjer mod knap 28 pct. i 1970.

Af de i alt 12751 synede køretøjer i 1971 konstateredes ingen tekniske mangler ved 10407 køretøjer. Ved 2344 køretøjer, svarende til godt 18 pct., mod 2294 køretøjer i 1970, svarende til godt 18 pct. af de synede køretøjer der var impliceret i færdselsuheld med dræbte eller med andre alvorlige følgevirkninger, konstateredes tekniske mangler af betydning for uheldet eller dets følgevirkninger.

Tekniske mangler ved bremser, dæk og styreapparat registreredes relativt hyppigt, medens mangler ved lygter m.v. samt karrosseri er mindre hyppige, jfr. tabel 29. I denne forbindelse må det haves i erindring, at køretøjets tilstand efter alvorlige kollisioner ikke altid giver mulighed for en sikker konstatering af tekniske mangler, og navnlig fejl ved lygter ikke altid vil kunne registreres.

Det fremgår endvidere af opgørelsen i tabel 30, at 1218 tekniske mangler, svarende til godt 44 pct. af samtlige konstaterede mangler med indflydelse på uheldet, var stærkt medvirkende til uheldet, medens 1410 mangler, svarende til godt 51 pct. af samtlige konstaterede mangler, skønnedes at have haft en mindre indflydelse på uheldets hændelsesforløb. Alene for 132 konstaterede mangler skønnedes på baggrund af de foretagne undersøgelser og foreliggende oplysninger

Tabel 29. Antal tekniske mangler med indflydelse på uheldenes hændelsesforløb fordelt efter køretøjsdel 1971

	I alt	Personbiler	Busser	Varebiler[1]	Lastbiler[2]	Traktorer	Motorcykler	Påhængsvogne	Andre køretøjer[3]	Uoplyst
Antal syn:										
I alt 1970	12399	8710	80	1559	767	88	412	202	507	74
I alt 1971	12751	9227	76	1321	718	77	386	186	674	86
Køretøjer uden tekniske mangler	10407	7703	67	1060	590	46	305	142	426	68
Køretøjer med tekniske mangler	2344	1524	9	261	128	31	81	44	248	18
Antal tekniske mangler:										
I alt 1970	2792	1817	11	342	163	32	124	53	237	13
I alt 1971	2760	1783	11	303	132	38	104	46	321	22
ved styreapparat	365	347	2	36	15	16	44	1	76	8
ved bremser	1069	664	4	122	70	5	44	31	123	6
ved lygter m.v.	216	125	2	24	17	10	8	6	23	1
ved dæk m.v.	601	493	1	79	9	–	7	2	5	5
ved karosseri m.v.	309	154	2	22	21	7	1	6	94	2

[1-3] Jfr. note 1, 2 og 3 til tabel 28.

Tabel 30. Antal tekniske mangler fordelt efter indflydelse på uheldets hændelsesforløb 1971

	I alt	Personbiler	Busser	Varebiler[1]	Lastbiler[2]	Traktorer	Motorcykler	Påhængsvogne	Andre køretøjer	Uoplyst
Antal tekniske mangler i alt	**2760**	**1783**	**11**	**303**	**132**	**38**	**104**	**46**	**321**	**22**
Stærkt medvirkende til uheldet	1218	764	3	140	73	25	38	26	137	12
heraf med forøgelse af følgevirkn. ...	173	97	1	31	6	5	5	3	22	3
Mindre medvirkende til uheldet	1410	918	8	145	54	13	66	19	178	9
heraf med forøgelse af følgevirkn. ...	167	99	4	17	7	3	4	3	28	2
Alene forøgelse af følgevirkninger ...	132	101	–	18	5	–	–	1	6	1

[1,2,3] jfr. note 1, 2, og 3 til tabel 28.

om uheldet i øvrigt, at manglerne ikke kunne siges at have haft betydning for uheldets opståen, men alene medførte en forøgelse af uheldets følgevirkninger.

Ved vurdering af det foreliggende materiale må det haves i erindring, at oplysningerne om tekniske manglers betydning ved færdselsuheld, alene omfatter et forholdsvis begrænset antal køretøjer, der var impliceret i færdselsuheld med dræbte eller med andre alvorlige følgevirkninger.

Qualification and Training of Personnel

MOTOR MECHANICS EMPLOYED IN REPAIR GARAGES

Normally, a motor mechanic works in a motor repair shop and has, thus, a fixed place of work.

The minimum condition for being apprenticed as a motor mechanic is graduation from primary school. The applicant for an apprenticeship must (as required) take a qualification test before he is accepted; this test is carried out in cooperation with the vocational quidance office, the trade corporation, and the workshop where he is to be apprenticed.

During the subsequent basic training, the apprentice is taught the basic skills in iron and metal processing, particularly measuring, filing, bending, straightening, riveting, forging and hardening of plain tools, soldering and brazing, welding, drilling, reaming, thread-cutting by hand, simple turning operations, and testing of materials as is normally done in a workshop.

The total practical training takes 4 years. During this time, the apprentice attends the classes provided for his trade in a vocational school. Here he is taught the necessary theoretical knowledge which the future motor mechanic needs in his many sided trade.

The journeyman's examination before the competent journeyman's examination committee terminates the apprenticeship, and here the apprentice has to prove that he has reached the training goals.

Further, the training is divided into special courses for passenger car mechanics and commercial vehicle mechanics. The motor mechanic may have his knowledge within the whole vocational field kept up to date and extended by attending post-training courses in the technical motor schools. Here also, the theoretical/practical training of the apprentices takes place and covers a period of about 12 months during the four-year basic training.

Post-training courses and specialist training are open to all motor mechanics having finished their apprenticeship. These courses are offered at full wages by the trade unions and the Ministry of Education, respectively, the latter administering the technical motor schools.

The Ministry of Justice is represented (via "Statens Bilinspektion") in the "Motor Committee" (Autoudvalget), which determines the main outlines of basic training and post-training of motor mechanics, as well as their possibilities of extended theoretical training at a Technical University, concluding with a final examination as an engineer specializing in motor technology.

In the "Autoudvalget" there are also representatives from the Ministry of Education, the motor car trade, the trade unions and the consumer organizations.

INSPECTORS AND SUPERVISORS EMPLOYED IN TESTING STATIONS

"Statens Bilinspektion" is the only institution authorized to check and approve vehicles where this is required by the Road Traffic Act.

Although the motor trade, the automobile clubs, etc., have tried to obtain authorization it has so far – from a political point of view – been maintained that this important task of safeguarding the community's interests as concerns taxes, police, and security should solely be in the hands of a politically controlled "nonprofit" Government institution directly under the responsibility of the Ministry of Justice.

The staff of "Statens Bilinspektion" is divided into the following main categories:

- Motor Vehicle Inspectors under the Ministry of Justice.
- Motor Vehicle Assistants.
- Office Personnel.

Motor Vehicle Inspectors

As occasion requires, mechanical or electrical engineers are employed as candidates for motor vehicle inspector jobs.

The engineer must take a two-year post-training course which is divided into 3 terms.

The first step is a practical/theoretical post-training at one of the large inspection stations, together with senior colleagues, and then, after having taken a number of special courses at the school of "Statens Biltilsyn," the engineer will be set to carry out independently all normal work occurring at "Statens Bilinspektion."

The training is supplemented by a number of tests of a more theoretical nature, which the candidate must pass in order to remain in the institution.

Having passed the examination, the engineer is paid the scale salary received by the assistants to senior motor vehicle inspectors. Then, when there are vacancies, the engineer is free to apply to the Ministry of Justice for a position as motor vehicle inspector, provided that the Ministry of Justice finds him qualified for the job, the applicant obtains a personal authorization.

The engineer who obtains authorization for an inspection district receives at the same time a personal increment. The amount involved is dependent on the size of the district.

Motor Vehicle Assistants

As candidates, motor mechanics can be employed, provided they have passed the journeyman's examination, and provided, also, that they are found suitable after an employment test.

The mechanic receives, in the course of 2 terms (divided over three years), special training so that he is able to make inspections of various categories of vehicles.

The training comprises:

- One year of training, partly in practice in the inspection stations and partly by means of courses and tests at the school of "Statens Biltilsyn."

  Having passed the examination and received a statement from the inspection station where he is employed, the trainee will be allowed to inspect ordinary mass-produced passenger cars, the responsibility resting with the vehicle inspector.
- Having finished the second and the third years' training in practical inspection work, supplemented by courses at the school – and after having passed an examination, the trainee receives authorization to inspect vehicles up to 12 tons in his own name, but still with the vehicle inspector as the responsible person.
- The third stage comprises supplementary training with courses, etc.
- Specialist training is comprised of a six-week theoretical course concerning commercial vehicles, tank-trucks, buses, and other large special types of vehicles.

  This course is concluded by an examination. If he passes this, the motor vehicle assistant is up for a certain increase in wages.

The motor vehicle assistants at the big inspection stations may be promoted to "chief vehicle assistants," provided that they are considered qualified not only to assist the ordinary vehicle inspectors in their professional work, but also to take over management activities.

Office Staff

Part of the office staff are civil servants and part of them are paid according to agreement. The staff takes care of all normal clerical work.

Additional Considerations

AUTOMATED INSPECTION

The main purpose of "Statens Bilinspektion" is:

1. To identify the vehicles to ensure that the Central Motor Register obtains relevant input data for the computer, and that these data are kept up to date.
2. To trace stolen vehicles.
3. To prevent fraudulent tax evasion through illegal import of vehicles to replace damaged vehicles for which tax has been paid previously. Furthermore, the fixed yearly taxes vary very much, dependent on motive fuel (petrol, gas, or diesel) and weight and purpose of the vehicle (passenger car or commercial vehicle).
4. To check that the vehicle is in conformity with the law and meets with the technical demands, so that it can be used without undue danger.

Item 1

Item 1 can be rationalized and automated by means of electronic data as well as a rational procedure of forms – things which have been done in Denmark.

Item 2

One link, however, is still missing, i.e., submitting computer input data directly from the vehicle inspection to the Central Motor Register.

In connection with the tracing of cars by the police for which, for instance, insurance or tax have not been paid, or which have not been presented for periodical inspection, Item 2 could be rationalized and made considerably more efficient, if the chassis number of the vehicle is cut into the license plate. In this case it would be possible to effect an efficient control on the spot just by comparing the chassis number on the license plate with the chassis number and license number of the vehicle and by checking a small sticker issued once a year by the computerized Central Motor Register, proving that taxes covering the current period have been paid.

It is a condition, of course, that the small annual sticker also shows the license plate number.

Item 3

Item 3 involves a relatively important source of income for the Ministry of Finance. Registration taxes and annual motor taxes vary considerably, depending on whether the vehicle has been approved as passenger car, as commercial vehicle, or as a combination of both. Also, the Government taxes on petrol, gas, and diesel oil vary greatly, a circumstance for which compensation has been attempted by differentiating the annual motor taxes according to the actual vehicle weights.

Item 4

In principle "Statens Bilinspektion" is instituted to verify that the vehicle is in conformity with the law; in other words that the owner of the car has not offended against police regulations, that the vehicle is in the correct tax category, and that the vehicle complies with road safety regulations.

In practice there is no time to examine the vehicle from "A to Z," and consequently, the work of the vehicle inspection is divided into two stages, the basic one comprising identification, motive fuel, steering gear, lights, and brakes.

The second stage depends on the vehicle inspector/vehicle assistant judgment, based on their professional knowledge, available technical specifications, and experience with regard to typical defects on the single types of cars.

In practice this system works as follows:

When a car is booked in, twenty effective working minutes are reserved for the first inspection of passenger cars and small commercial vehicles and ten effective working minutes for subsequent inspections.

Even though the vehicles are prepared for inspection in advance, statistics show that they average four defects, and that more than sixty percent of the vehicles presented for inspection have defects so dangerous that "Statens Bilinspektion" must have them in for inspection once more in order to ascertain that appropriate repairs have been made.

In principle there is no doubt that good working conditions and modern testing equipment combined with electronic data processing and viewing screens – to assist the vehicle inspector/vehicle assistant with readily available experience data and digests on defect frequencies for any type of car – as well as automatic processing of forms and registration papers is apt to increase capacity and efficiency of the inspection procedure. Also, lists of deficiencies, certificates of approval and registration can be transferred to electronic data processing. On the other hand, I am quite sure that a fully automatic procedure can in no way equal a semiautomatic process based on the expert knowledge of professional vehicle inspectors/vehicle assistants.

In an important field like, for instance, brakes, it is not only a question of adjustment and condition of the brake pedal, or the tightness of the hydraulic system and the braking power of each wheel. It is just as much a question of the auxiliary properties of power brakes, fluctuations of the braking power values on one turn of the wheel registered at the circumference of the tire, the distribution of the braking power between front and rear axles with a view to the stability of the vehicle.

These and many similar tests, which are of the greatest importance as regards road safety, cannot be automated, but must, in my opinion, continue to be subject to a professional estimate, where the expert is assisted in his judgement by means of electronic data processing.

In case of commercial vehicles, trailers, and buses, it is even more important for road safety that the expert's judgment and knowledge, and his capability of tracing faults or detrimental construction details form part of the inspection procedure. This is the reason that, in Denmark, we have specially trained personnel for approval of heavy vehicles, and the time provided for each vehicle on first presentation is up to 45 effective working minutes.

VOLUNTARY INSPECTION

"Statens Bilinspektion" has also made voluntary inspections possible.

Voluntary inspections are carried out on the same lines as the compulsory ones, and at identical fees.

An increasing number of motorists avail themselves of this arrangement which has the sole purpose of assisting the car owners to keep their vehicles in conformity with the law, and to ensure that car owners and drivers can meet the obligations placed on them under the Danish Traffic Act.

There is a pronounced increase of voluntary inspections when "Statens Bilinspektion" – in cooperation with the police – stops vehicles on the roads for on-the-spot technical inspections.

For these inspections "Statens Bilinspektion" uses vehicles specially equipped as mobile workshops.

Those vehicles which are found to have severe defects are accompanied by the police to the nearest inspection station where they undergo a very thorough inspection witnessed by the driver and the police.

The police officer makes out a report, and in case of serious defects the license plates are removed, and driver and/or owner are heavily fined. Moreover, the driver may have his license suspended for (normally) six months.

Vehicle inspections of this kind are often made in the presence of TV and members of the press, who "shoot" the defective vehicles and interview the drivers.

Publicity of this type has a generally preventive effect and usually results in increased demand for voluntary inspections and pressure on the automobile workshops.

It should be noted that defects ascertained at the stations in the course of a normal vehicle inspection are not subject to police information, fines, etc. – these are measures which are only taken when "Statens Bilinspektion" assists the police with spot checks on the road.

If a normal inspection of a vehicle discloses serious defects, the car must be presented once more within two weeks in order to prove that it has been properly repaired.

If, for instance, the brakes fail during the inspection, "Statens Bilinspektion" just removes the license plates and delivers these to the Motor Office, from whence they will be handed out again without fine, provided that the vehicle is reentered for registration and approved by "Statens Bilinspektion."

Automobile clubs, Volvo dealers, etc., recommend voluntary inspections to their member/customers and pay half of the fee or the total amount involved. This is partly a preventive measure and partly an additional guarantee when purchasing secondhand cars.

At least twice a year, "Statens Bilinspektion" conducts a campaign in cooperation with "Rådet for Større Faerdselssikkerhed" (Council for the Improvement of Road Safety) concerning lights, brakes, and air pollution. During the campaigns, "Statens Bilinspektion" is open also outside the normal working hours and on Saturdays and Sundays.

Normally, these campaigns are followed by intensified spot checks on the road, conducted by the police in cooperation with "Statens Bilinspektion."

As it is usually the car dealers who sell secondhand cars with a guarantee of "inspected and approved," it is important that the new owner can present his car for a voluntary inspection, if he finds the car defective.

Now and then, it happes that spare parts, such as tires, batteries, lights, shock absorbers, etc., are removed by the seller after the vehicle has been approved by "Statens Bilinspektion." This is another reason why voluntary inspections must be possible.

Traffic Controls, together with the police, also prevent the car owners from being tempted to "borrow" car parts in order to pass a compulsory inspection.

CONSUMER INTERESTS

A State-operated motor vehicle inspection has proved more and more important to the consumers as the costs of purchase and running are a relatively large strain on a private budget.

There are two automobile organizations in Denmark, one is KDAK (Royal Danish Automobile Club), which is affiliated with the international FIA, and the other is FDM (United Danish Vehicle Owners), which is affiliated with the international AIT.

KDAK cooperates with the motor vehicle inspection.

FDM has built up its own technical service and has, among other things, test stations over most of the country.

Furthermore, there is a real consumers organization named "Forbrugerrådet." The "Forbrugerrådet" gets a still greater political support and cooperates among, other things, on a northern level with Sweden and Norway, where organizations to look after the consumer interests are being developed in political stage management.

The motor vehicle inspection in Denmark, therefore, cooperates more and more with the "Forbrugerrådet," publishes the magazine "Bilsyn" (The Motor Vehicle Inspection) and communicates often with the press, radio, and TV.

The motor vehicle inspection also cooperates with the organized part of the automobile trade, in relation to commercial as well as repair technical respects. If, for instance, a member of DAF (Danish Dealer Association) has made an unwarrantable repair, and it is discovered upon inspection, the motor vehicle inspection will report the case to DAF, which will disapprove of the matter, indemnify the car owner for a financial loss, and in gross cases, the member will be excluded.

In accident cases where the fault can be traced back to an unwarrantable repair, the police and the Prosecution will try, after recommendation from the motor vehicle inspection, to have the repairer punished.

Therefore, "Statens Bilinspektion" also cooperates with the associations of workshops, owners and dealers. the trade union of the automobile mechanics, and the Ministry of Education, in order to bring the education of the automobile mechanic apprentices and the post education of the automobile mechanics up to date.

A state arrangement of authorization has not been brought about for the time being. Among other things, it can be easily abused, and it can often give rise to monopolization.

Maybe, it will later be possible to impose a kind of authorization on every single mechanic, an authorization which is related to his official certificate as, for instance, passenger car mechanic, truck mechanic, automobile electro mechanic, pneumatic brake mechanic, etc.

In cases of serious traffic accidents the police send for the test examiner. This will take place in about 30 percent of all traffic accidents with personal injury. The examiner's job is, from a technical point of view, to try to elucidate the reason for the accident. By examining the road conditions, the cars involved, their damages, the brake and skid marks, etc., the test examiner takes part in elucidating the matter in an objective way in support of the persons involved, the police, and possibly the court.

MISCELLANEOUS

The existence of "Statens Bilinspektion" has led to the formation of a cadre of impartial and experienced motor vehicle experts, who are available for carrying out important work in the sphere of road traffic. Activities of this kind are, for instance, outside the compulsory motor vehicle inspection:

- testing of prototypes of an intended series production (approval test) for the granting of the "General Type Approval,"
- individual tests of vehicles which have been changed in technical respect,
- testing of vehicles for the granting of an operating permit in individual cases,
- advisory function with respect to legislative measures in the national and international sphere,

- organization of an extensive exchange of technical experience,
- development of specific testing installations (e.g., roller brake test stands) and setting up rules for their testing, adjustment, and maintenance,
- statistical recording and evaluation of the test results for the purpose of informing the car owners in question of the weak points and as far as possible, of preventing that new models are approved with the same defects,
- driving tests, especially for trucks, buses and handicapped people,
- participation of motor vehicle experts in examinations of driving instructors,
- problems as regards motorizing of the handicapped people – conversion of cars, driving tests, state subsidies,
- medico-psychological research for vehicle drivers,
- function as experts for law courts and public prosecution,
- measures for making vehicle tests and driving tests more objective and thus guaranteeing a well-balanced standard of judgment, primarily based on accident relations,
- contribute to promoting the education of the automobile mechanic apprentices,
- contribute to the information on greater safety in the traffic and to the traffic safety research by means of newspapers, radio, TV, the "Council for Greater Traffic Safety," the "Council for Traffic Safety Research," the "Technical University of Denmark," the "Traffic Medical Society," etc.,
- contribute to improving the road sector so that black spots are removed and road norms and standards are made better.

Locally, the test examiner, the Chief Constable and the road engineer cooperate when investigating the circumstances of occurred accidents.

Nationally, the motor vehicle inspection is a member of a road standard committee in the State Road Department.

PART FIVE

UNITED KINGDOM

General Remarks

Institutions in Charge of Inspection

Qualification and Training of Personnel

Additional Considerations

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PART FIVE **UNITED KINGDOM**

General Remarks

In the United Kingdom, responsibility for MVI, as with the rest of Road Safety, is divided between Great Britain and Northern Ireland. The Northern Ireland Ministry of Home Affairs has a separate responsibility for this in Northern Ireland, and the provisions for compulsory inspection differ, with particularly wide divergencies in respect of private cars. The rest of Great Britain has a unified system whereby all vehicles are subject to a combination of random and periodic (mainly annual) examinations. Random checks are carried out, by government examiners, at the roadside, but also on the operator's premises in the case of heavy goods vehicles (HGVs) and public service vehicles (PSVs), i.e., most large passenger vehicles. About 20 percent of the PSV population, and 25 percent of the HGV, are given random inspections each year. HGVs found defective in such checks can be prohibited from further use until repaired; for PSVs the license to carry passengers is suspended; but with cars (only a small proportion of which are, in fact, given spot checks) examiners only have powers to advise owners of vehicle defects.

Periodic tests are carried out for cars, motorcycles and vans by a network of approximately 20,000 specially appointed private garages, and some local authorities for HGVs, in purpose built government testing stations; and for PSVs, by government engineers in operators' own premises, but these are by arrangement, approximately annually, but not at fixed intervals. The private car inspection covers the main safety items only, but that given by HGVs and PSVs is a comprehensive check of the vehicle's mechanical condition.

The British Government has no objective evidence to indicate whether or not this particular "mix" of random and periodic inspections is the most effective. Commercial vehicles are subjected to more stringent tests because their average use, size and weight seem to indicate that they present relatively more danger than private cars. The British Government, therefore, included MVI in a recent survey of all its activities related to road safety carried out to see which options for future action were most promising. As part of this, an attempt was made to assess the costs of, and the road safety benefits which result from, the present systems of MVI. No attempt was made to assess benefits other than any reduction in the number or seriousness of accidents.

In assessing the costs, account was taken of the following:

- the cost to the government in providing testing stations, carrying out tests and in supervising authorized examiners in the private sector;
- the cost to the private sector in providing and staffing authorized test centers. (Since the motor vehicle test fee is calculated to reimburse private testers their current expenditure and provide a reasonable return on capital, the fees were used as an estimate of this cost.);
- the opportunity cost to the public of presenting vehicles for test. (This represents the cost of otherwise unnecessary travel to and from the test center, the time of the driver on the journey and during the test, cleaning the vehicle – in the case of heavy goods vehicles and public service vehicles where the regulations demand this – and any loss of earnings from the vehicle while it is out of service for the test.);
- the cost of repairs which are carried out solely to enable a vehicle to pass a test, whether before a test in anticipation of rejection or after rejection;
- similar costs attributable to retesting failed vehicles.

The importance of these various factors varies as between the three systems of testing. Since, for example, public service vehicles are tested at a time convenient to the operator, and for the most part on the operator's premises, the cost of travel to the test center and the loss of earnings are negligible, while for heavy goods vehicles, which have to be tested at a limited number of centers, and which do not have the same amount of "slack" time when they are not earning as do public service vehicles, these costs are estimated to be the most significant. The costs were estimated on the basis of the knowledge available to the Department of the Environment, and in the case of the test for private motor cars (which is not

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directly carried out by the Department) a special field survey of sample tests was carried out.

The most difficult item to estimate, and in the case of private cars the most significant, was that of induced repairs. Since the review, of which this assessment formed part, was of the effectiveness in promoting road safety of various uses of resources, it was necessary to include the full costs of any repairs which could be shown to be due to the test; no account was taken of repairs which were merely coincidental in time with the test. In all cases, estimates could only be made within very wide parameters.

In assessing the value of the benefits, the greatest problems were encountered in identifying them. Since the schemes for public service vehicles, private cars, and heavy goods vehicles were introduced at different times, each had to be considered separately. The public service vehicles scheme has been in operation for over 40 years and so no useful "before and after" data exist. Levels of activity have, however, varied and comparisons can thus be made between different periods. A return to prewar levels of inspection after 1950 was accompanied by a reduction in the number of PSVs involved in accidents, but clearly this was not the only factor involved. Since the mid-1960s, there has been a continuing decline in accident involvements accompanied by steady level of inspection. For private cars the scheme was introduced gradually with the older cars first; by the end of 1961, all cars over seven years old were included; by 1967, the present minimum age of three years was reached. The trend in the overall accident rate, though improved, did not diverge from that for heavy goods vehicles, which were not then subject to periodic testing. Nor were there any discontinuities in the accident rates for each age group of cars as they became liable to testing. The advent of testing of heavy goods vehicles in 1968-70 was followed by a sharp and continued improvement with accident rates. However, since this change was allied in time to other measures aimed partly at improving maintenance and partly at improving the quality of driving, the combined effects cannot be separated, but from the timing of the changes, MVI appears likely to be the less significant. From the statistics studied, it has not been possible to identify any road safety benefits which may have flowed from the introduction of MVI.

In the context, therefore, of a review to consider the best way of expending resources to improve road safety, the Department of the Environment looked to see what benefits would have to flow from an increase in MVI to justify the use of any extra resources. Taking private cars as an example, a survey by the Transport and Road Research Laboratory showed that in only 6 percent of the accidents investigated involving private cars were mechanical defects a main or contributory factor. Using the conventional costs for accidents (which lead to no difficulties in this case, since the same were used in evaluating the benefits of other potential users of extra road safety resources), calculations showed that the total elimination of all accidents of this kind could not justify an increase of more than twenty to twenty-five percent on the resources devoted to private car testing, even after discounting any excess of costs over benefits which may already exist.

Since no periodic testing scheme could hope to eliminate all accidents resulting from vehicle defects, not even the whole of a 20 percent increase could be justified. An increase of less than this would seem unlikely to have significant effect, and the conclusion, therefore, was that extra resources could be put to better use elsewhere. The percentage of PSV accidents involving mechanical defects seems even smaller, and consequently, the justification for extra resources would be even less. For heavy goods vehicles a similar argument applies.

The outcome of the review has, therefore, been to suggest that extra resources for road safety would be better devoted elsewhere, where positive benefits are available. This leaves open for further study the question whether the benefits as a whole of MVI outweigh the costs to the community, and how the ratio can be improved. However, the existing arrangements are already to a certain extent geared to discriminate between broad classes of road users, so that testing resources are concentrated where they will be most effective. For example, with the (relatively) huge numbers of cars, and their (relatively) better accident record, the cheaper and more convenient testing facilities provided by private garages are preferred, despite their well-known disadvantages in efficiency, the opportunities provided for abuse, etc.

LEGAL PROVISIONS, QUALITY CONTROL AND COMPULSORY MEASURES

Legal Provisions

The broad legal powers for the safety of vehicles (construction, use and maintenance) are contained in

Acts of Parliament, mainly the Road Traffic Acts 1960 and 1972, which delegate to the Secretary of State the authority to make regulations for the detailed technical provisions. These regulations may be made, and amended with only the tacit consent of Parliament. For vehicles there are the Construction and Use Regulations (C and U Regulations) supplemented for PSVs, by the Public Service Vehicles (Conditions of Fitness, Equipment and Use) Regulations. Each of these contains standards for vehicles and components, and their performance, both as new and in use. It is at present the manufacturer's responsibility to ensure that new vehicles and components comply with the appropriate regulations, but it is intended soon to enforce these through a type approval system.

There are separate regulations covering the testing of certain vehicles in use. These are:

- The Goods Vehicles (Plating and Testing) Regulations (for heavy goods vehicles, i.e., over 30 cwts unladen weight).
- The Motor Vehicles (Tests) Regulations (for cars, motorcycles and light goods vehicles).

These regulations prescribe the scope of the inspection (i.e., which items are to be checked against C and U Regulation Standards); the classes of vehicles to be tested; the issue of pass or fail certificates; the making of appointments for tests and retests; fees; arrangements for roadside checks; arrangements for appeals; the manner and conditions of carrying out tests (for authorized car testing stations only); and so forth.

PSVs are a special case. There was no need for regulations to cover the testing arrangements, since these are flexible and the general powers contained in the main legislation were adequate, viz., "An examiner shall at any time . . . be entitled to enter and inspect any PSV and for that purpose may require any PSV to be stopped and may at any time . . . enter any premises on which he has reason to believe that a PSV is kept. . . . " Government engineers carry out their PSV inspections against the provisions of the Public Service Vehicles (Conditions of Fitness, Equipment and Use) Regulations referred to above.

Quality Control

It is difficult to overestimate the importance of quality control in an effective testing scheme. Arrangements for it should take into account the selection and training of staff, the design, construction and use criteria of a particular testable item and the degree of its importance from a safety point of view, economics and the requirements of legislation. Standards or guidelines can rely on subjective assessment, but it is important that they are uniformly applied and maintained. This necessitates physical checks, training (involving demonstration, discussion) assisted by accurate and regular statistical information from the field. Direction from the center is very necessary.

Compulsory Measures

Cars, motorcycles and light goods vehicles over three years old, and HGVs over one year old, must be tested annually. Owners of such vehicles who do not possess a valid test certificate may be prosecuted and fined up to a maximum of £50. Enforcement is partly by the police, but mainly through the link with vehicle licensing; applicants for a vehicle license must show a valid test certificate.

In the case of spot checks, present regulations only allow for car owners to be advised of defects found during an inspection. HGVs, however, can be prohibited from use, until satisfactorily repaired, and the prohibition has been cleared by a government examiner. A PSV found defective – either during a spot check, or one of the arranged periodic examinations – can have its license suspended. Consideration is currently being given to extending the HGV prohibition system to PSVs and cars to strengthen enforcement.

NATURE AND SCOPE OF INSPECTION

Compulsory vehicle inspection was first introduced in the UK in 1930, for PSVs. Then, as now, the inspection was a comprehensive one covering the mechanical condition of the vehicle, and also passenger safety and amenity, i.e., heights and width of gangways, spacing of seats, handrails, safety glass, etc.

Compulsory testing of cars, motorcycles and light goods vehicles was introduced in 1960, on a fixed annual basis, to be carried out by garages authorized by the then Ministry of Transport as testing stations. At first the arrangements covered only vehicles ten years old and over, but this testable age was gradually reduced to the present three years and over, which was set in 1967. The scope of the test has always been restricted to the basic safety items. The original brakes, steering and lights was expanded to include tires (1963) and seat belts (1967 – a simple check on whether or not they were fitted). Any roadside spot checks on cars must also be confined to these basic items.

The Road Safety Act 1967 introduced compulsory annual testing of HGVs in government testing stations. The scheme began operation in 1968, and by the Spring of 1970 all the eligible vehicles had undergone their first examination. The test is a comprehensive one. The items to be inspected (with the main reasons for rejection) are set out in simple terms in a manual available to the public (see page 117). This manual is also used by the testers in the stations, but they also receive considerable detailed guidance and training. This is intended to eliminate most of that discretion in decisions about pass or fail for particular components which is inevitably (because of the diversity of the scheme, and the infrequency of supervision) left to their counterparts in the private car testing stations.

In addition to periodic and random inspections, consideration has been given in Britain to the introduction of tests on change of ownership, and after accidents. (Both of these are included in the EEC proposals for harmonization of MVI systems within the Community.) The former is regarded with some favor, because it would bring extra consumer benefits and because it may catch many of the high mileage, and roughly used, vehicles which change hands before they reach testable age. But there are administrative difficulties to overcome. There are even greater administrative problems involved in tests after accidents, and research in Britain has indicated that vehicles repaired and reused after accident damage do not constitute anything but a very minor road safety hazard. Accordingly, this possibility has been rejected.

TYPE APPROVAL AND DEFECT RECALL PROGRAMS

Only for PSVs has there been a type approval system in Britain and this since 1930, but it has been little used since manufacturers have regularly opted for the alternative of individual vehicle certificates (by government engineers). It is now the intention, when Parliamentary time permits, to introduce the necessary legislation for compulsory type approval for all classes of vehicles. This will bring Britain in line with practices in the other Common Market countries.

For the present it is the manufacturers' responsibility to ensure that their products conform to the appropriate regulations, and where errors or oversights occur, to recall and rectify the vehicles concerned. These are largely informal arrangements, and no set enforcement procedure is in operation in the UK, although government engineers investigate fully any complaints, or reports, of design defects in vehicles and agree with manufacturers as to the appropriate action to be taken. This system is largely regarded as effective. The threat of adverse publicity, and subsequent loss of sales, is sufficient to persuade manufacturers to rectify design or production defects in their products. (There is no record in the UK of any significant defect which has not been quickly rectified at the initiative of the manufacturer.)

PERIODICITY OF INSPECTION

British considerations of tests on change of ownership, or after accidents – either instead of, or extra to, regular periodic tests – has been discussed previously.

It seems to be generally accepted internationally that MVI should be at regular intervals, if it is to represent a continuing influence on the maintenance standards and habits of vehicle owners. It is argued that its force lies in the impossibility of avoidance; that there must be at least one regular check on a vehicle's condition and roadworthiness. There is also the argument that this standardization in inspection arrangements permits the economic use of testing stations, where inspections can be conducted with more speed and efficiency. The main comparison is, of course, with random, or spot checks, and it can be argued for this system that the lack of knowledge of when (or where) an inspection will take place means a vehicle owner has to make sure his vehicle is always roadworthy, whereas with a periodic check he only needs to do this once a year, or every two years, or whatever is the prescribed method. But the chance of being spot checked must be high, to achieve this attitude of mind, and this is difficult for any Government, with, for instance, the large number of cars on the roads. For HGVs and PSVs, it is more of a practical proposition, and in Britain, 25 percent and 20 percent, respectively, of these vehicles are spot checked each year (in addition to their periodic examinations).

The PSV inspection system in Britain may provide a good balance between these points of view. The interval between tests is flexible, though normally annual. But if an operator has a bad maintenance record, the Government examiner may decide to inspect his vehicle fleet at six monthly intervals, or even less. On the other hand the system allows for a good operator to enjoy periods in excess of three months between inspections. Such an arrangement makes for effective use of vehicle examiners in concentrating their efforts where they are needed. But it is only a practical system with small numbers of vehicles (there are 75,000 PSVs in Britain) where the necessary information about operators and their standards can be available.

For all vehicles in Britain (with the exception of PSVs), 12 months is regarded as a suitable period between inspections. There have not been any experiments with a different frequency, and no objective information exists to support this period. But it is doubtful if the benefits from more frequent tests would justify the increased costs involved, and there is a widely held, if subjective, view that a longer period would not represent sufficient control over the condition of vehicles. Any evidence available from other countries on this question would be welcomed.

Institutions in Charge of Inspection

TYPE AND STATUS

For cars, motorcycles and light goods vehicles there are approximately 20,000 Authorized Examiners in Britain, mainly private garages but with a few local authorities. Motorists can choose which testing station to apply to, and with such a large number most have a few within easy reach. There are no franchises, or districts, allocated to particular testing stations.

The scheme is administered and supervised by the Department of the Environment. Adequate supervision has, however, proved impossible with so many stations, and standards of testing have varied between different garages, attracting adverse publicity for the scheme. But because of the "spin-off" in repairs and servicing the authorization to test is attractive to garages, and it has accordingly been considered unfair to refuse an application from any garage possessing the necessary staff, equipment and facilities. (Each car testing station must be equipped with two hoists or pits, a headlight beam checker, tire tread measure, and brake meter.) Hence, the large number of stations; a year ago an embargo was placed on new authorizations, whilst the possibilities of achieving a significant reduction were considered. This examination is continuing.

HGVs are tested in approximately 90 government centers, all specializing in testing – and the majority purpose built. The Department of the Environment administers the scheme, operates the stations, and employs all the staff. There is thus a high uniformity of standards, which is important in a scheme involving considerably more comprehensive and detailed inspections than those undergone by passenger cars.

Operators applying for a test to the Goods Vehicle Center (the booking authority for the whole of Britain) are allocated to a particular station. The stations do not have a rigidly defined catchment area, so preferences can be stated. The pattern throughout Britain is such that 90 percent of vehicles are less than 25 miles from a testing station.

The lanes in HGV stations have modern specialist equipment for vehicle testing, e.g., roller brake testers, load simulators, well-equipped pits, etc.

While the specialist HGV stations clearly represent the most efficient facilities for testing vehicles, there is considerable economic merit in using the excess capacity available in existing private repair workshops and garages. Little, or no capital outlay, or diversion of manpower is involved. Furthermore, the greater convenience for the motorist, both in traveling (specialist stations are inevitably fewer in number) and in being able to associate the test with necessary repairs, reduces the costs induced by testing. Consideration has recently been given to the replacement of the present 20,000 or so authorized garages by a small network of specialist stations, but this possibility has been rejected because it is considered that the extra benefits would not justify the increased costs.

SUPERVISION

Britain is divided administratively into eleven Traffic Areas, each of which is subdivided into approximately 20 districts which are staffed by technical officers. Traffic Areas are responsible for the authorization and supervision of the car testing stations within their boundaries, and the technical staff visit them regularly to check facilities and paper work, testers, etc. Where a testing station is under supervision, "incognito" checks are sometimes made, i.e., a government inspector submits a car for testing in order to observe the testers at work without identifying himself.

FEE SYSTEM

Fees are charged for the HGV and car tests, but not for the PSV inspections (with the exception of the Certificate of Fitness examinations, given to a PSV when new and subsequently repeated at intervals of seven years or less, at the Examiner's discretion). The fees are fixed by law (any increases require amending regulations) and are applicable throughout the country. For HGVs there is a small variation by size of vehicle. For both groups of vehicles retest fees may vary by the number of items to be retested; but in British experience, there is a danger in making retests too cheap, for this can encourage owners and operators to treat the first examination as a kind of advisory service.

The HGV test fees are set and charged by the Government. Since these only seek to cover costs, increases are only made when necessary to cover a shortfall between the expenses and income of the scheme.

COLLECTION AND USE OF DATA

The benefits for manufacturers and consumers from the dissemination of car testing statistics are appreciated in the UK. However, the present scheme, based on large numbers of privately owned testing stations, does not readily allow for the collection of such statistics. There is also concern about varying standards of testing among so many stations, casting doubts on the value of any resulting data. Neither of these remarks applies to the HGV testing scheme, from which official statistics are from time to time made available to the trade press, operators' associations, etc. But in the absence of any marked demand the information provided is general, rather than broken down by vehicle types, makes or models.

Qualification and Training of Personnel

MOTOR MECHANICS EMPLOYED IN REPAIR GARAGES

The standard of ability and expertise of Authorized Examiners and mechanics in the individual garages is largely a reflection of the standards and practices of the vehicle repair industry. In Britain there are no set qualifications for motor mechanics, but training and general standards are being improved through the activities of the Road Transport Industry Training Board. Such improvement is especially welcome in an industry which has not in recent years stood high in public esteem for the quality or reliability of its service to the customer.

INSPECTORS AND SUPERVISORS EMPLOYED IN TESTING STATIONS

To be a tester in a British private car testing station, a mechanic simply has to be nominated by the Authorized Examiner. At some stage he will be examined and assessed by a government inspector, who may reject him, but the supervisory resources are so stretched (there may be 60,000 or more nominated car testers at any time) that this may not take place immediately, or frequently. As for training, special courses are available for testers, but a compulsory training program would not be practical with such large numbers. This should not in any case be necessary. The scope of the test is restricted to the basic safety items, and a motor mechanic's normal work and experience should equip him adequately for this.

The Authorized Examiner is to be held responsible for the actions of his staff, even though in practice he may delegate supervisory duties to a subordinate.

Supervisors in government HGV testing stations are graded as Technical Officers, and the requirements set out for recruitment are:

Qualification

Candidates must have a good practical knowledge of motor vehicle construction and operation and a clear understanding of the technical principles involved. They must have had adequate practical training and experience, and should have followed a recognized course of study.

Training

Candidates must have served an apprenticeship or equivalent workshop training either with a vehicle manufacturing company, or with a well-equipped firm of automobile repairs, or in a vehicle maintenance and repair shop of a public or commercial undertaking of some size.

Experience

After training candidates must have had practical experience as skilled motor mechanics. They must have experience of the repair of a chassis and bodies of heavy commercial vehicles and have experience in driving such vehicles. The total period of training and experience must be not less than eight years. Testers are not required to have previous formal training and the Vehicle Inspection Division provides a special course covering the routine of inspection in detail. (There is approximately one Technical Officer supervising every four testers.)

Additional Considerations

AUTOMATED TESTING AND DIAGNOSIS

Technical Considerations

Commercial and prototype equipment is available today to convert the present generation of diagnostic centers, which are largely based on semiautomated brake and engine analyzers, into a fully automated diagnostic inspection system. An automated diagnostic inspection system is defined as the application of computerized equipment and electronic data processing techniques to the objective inspection of those automobile systems which pose a safety hazard, as well as the determination of the subsystem or component which creates the hazardous condition.

Automated diagnostic systems can be used either as equipment in a diagnostic center (known as off-board equipment); or as equipment built into the vehicle (known as an on-board system), where it would continuously monitor any deterioration in the systems or subsystems and components of that vehicle.

It is quite apparent that because of the high development and installation costs of on-board equipment work will be concentrated initially on the development of off-board equipment which can accommodate any vehicle wheelbase configuration and can assess the performance limits of engines, brakes, steering, suspension and tires in place, without component removal and repeated application of instruments. The capabilities of these off-board systems will probably be further enhanced in time by the use of permanently installed on-board sensors or transducers which will permit the use of electronic data processing methods and computer techniques which in turn will eliminate the need for instrumentation.

The greatest use of these off-board diagnostic systems can only be achieved when agreement has been reached on a standardized form of diagnostic plug attachment to which the umbilical cord from the diagnostic system can be attached to the vehicles. Although there are considerable advantages in reaching agreement on a standardized diagnostic plug, it was felt that some of the advantages could be dissipated if this, in turn, inhibited future developments by reducing competition.

The Volvo motor company has already developed an off-board diagnostic system giving a comprehensive electrical check to new vehicles at the end of the production line. Volkswagen has developed an off-board system for their new models, which are fitted with a diagnostic plug in the engine compartment into which a computer can be plugged, taking data from sensors fitted into the engine components. This data can be compared with the manufacturer's specifications on a preprogrammed punch card. This servicing diagnostic equipment is already in use in this country. The American Army has also developed similar equipment and at least one Japanese motor manufacturer has done the same thing.

It is interesting to note that the U.S. Army has already contracted for the development of three generations of automated test equipment, the first generation of which is to be mass produced before 1975. The equipment consists of two packages, a transducer kit and programmable diagnostic unit. The transducer kit contains all the cables, adaptors and instrumentation that are hooked onto the engine to collect data and transmit it to a diagnostic unit. The diagnostic unit, through magnetic tape cartridge, will measure specific engine parameters and determine what is wrong with the engine, whether defective components should be repaired, replaced or adjusted, and will even automatically indicate to the mechanic the stock number for the components requiring attention.

The second generation will have the transducers and sensors built into the vehicle, allowing the computer diagnostic module to be plugged into an on-board diagnostic plug. The third generation of automated test equipment will incorporate complete "on-board" components capable of self-diagnosis. Prototype on-board diagnostic systems are already in use experimentally in the U.S. Army, and others have apparently been developed experimentally by a number of Japanese motor manufacturers.

ADVANTAGES CLAIMED FOR AUTOMOTIVE DIAGNOSTIC SYSTEMS

Considerations of Road Safety and Environmental Pollution

The National Highway Traffic Safety Administration (Department of Transportation, U.S.A.) considers that in those States where periodic testing is practiced, the average time spent on inspections (five to six minutes) is too limited. This does not allow for an effective check on the condition of safety critical subsystems and components. Tires are a typical safety critical item where the present techniques for their inspection are both time consuming and tedious and are often not carried out completely, with the result that bald or damaged tires may only be spotted accidentally. The technology already exists whereby the size, type of tire, tread depth, tire pressure, and condition of tire walls cannot only be checked automatically and objectively, but the results recorded for comparison with agreed acceptable standards of condition.

Exhaust emissions can be very easily checked by diagnostic equipment, and this is an area for urgent attention. The problem relates specifically to vehicles which have been manufactured in recent years. At the time of manufacture, the engine components were adjusted to give the minimum exhaust emissions. During the course of routine servicing, these components have been adjusted by service staff to provide the vehicle with maximum performance, which has resulted in the vehicle emitting excessive quantities of pollutants on the exhaust. It is very difficult to remedy the situation without the use of diagnostic equipment. Service staffs should be educated to consider emissions rather than performance.

Consumer Protection

In the U.S.A. politicians appear more concerned with developing automotive diagnostic systems for reasons of consumer protection than road safety. There is a general feeling that a high percentage of garage organizations are unscrupulous and/or incompetent, and the motoring public receives very poor value for money spent on servicing or repairing their motor vehicles. It is not an uncommon practice for motorists to have parts of their vehicles replaced or repaired even though the expense could not be justified in terms of improved performance or increased road safety. Again, many defective vehicles are repaired on a trial and error basis, and the motorist is expected to pay the bill regardless of the fact that a high percentage of the cost may be due to the garage's incompetence.

There is a worldwide concern about this, and many hope that the development of automotive diagnostic systems will remedy this very unsatisfactory state of affairs. They envisage that within a few years private motorists may be able to visit self-service diagnostic centers which are open for twenty-four hours a day, where for a nominal charge, and just for attaching the umbilical cord to the vehicle's diagnostic plug and registering on the machine the identity number of the vehicle to be tested, they will receive within a few minutes a printout giving an objective report on the vehicle's safety critical and/or service critical systems and subsystems. The printout would compare the vehicle's performance or state of deterioration with either the specification for a new vehicle or a service norm. The consumer would be in a position to use the printout as an order form for service repairs and the diagnostic center could later be used to measure the improvements attributable to those repairs.

Economic Benefits

There is a view that preventative maintenance is a wasteful use of skilled staff and national resources. In a world where there is a rapidly increasing number of motor vehicles, and a reducing number of skilled mechanics to service them, it seems a serious waste of talent to use these skills checking over vehicles for the purpose of assuring either the owner or the State authorities that the vehicle is in a roadworthy condition. It could represent a better use of national resources if skilled mechanics were only employed to rectify defects reported by automated diagnostic systems. Considerable savings could surely be achieved. Looking further ahead to on-board systems continuously monitoring the condition of the vehicle for the benefit of the driver, it should then only be necessary for the vehicle to be sent to a garage for repair when such a need is registered on the diagnostic equipment. Many warnings, such as worn brake linings, could be signaled before the vehicle became unroadworthy, an obvious advantage over preventive maintenance and testing.

The Japanese already have a prototype on-board diagnostic system which not only indicates to the driver the need for attention to safety critical systems, but is also capable of automatically transmitting this information, together with the vehicle's identity, directly onto the enforcement authorities' computers. It is the driver's responsibility to have the defects rectified and notify the authorities accordingly within a set time limit. One can visualize that eventually periodic vehicle inspections will be superseded by such on-board diagnostic systems.

Figure 14 shows the United States list of items to be inspected, amended according to the United Kingdom Procedure.

VOLUNTARY INSPECTION

A car owner in Britain can voluntarily have an extra test at any time (gaining a certificate which will replace his existing one), but there is no provision under this scheme (or the HGV scheme) for an extended examination, perhaps including diagnosis of faults to be available. Government organized voluntary tests are not judged to be necessary at the present time, since adequate services are already offered by many garages and (for those who value independent advice) the principal motoring organizations.

CONSUMER INTERESTS

As explained earlier, benefits for consumers in statistics on the test performance of particular models and types are not readily obtainable from the existing British car testing arrangements; and present plans for reorganization are not concerned to make the introduction of such a service possible, in the absence of any clear demand for it. However, British interest in the EEC proposal for change of ownership tests (see page 76) is partly based on the indications that these would be welcomed by consumers. In the secondhand car market a current (or perhaps new) test certificate has become an important bargaining point, and many would-be buyers also insist on a further examination (e.g., by one of the motoring organizations) before agreeing to purchase.

	PUBLIC SERVICE VEHICLES	TRUCKS	CARS
AUDIBLE SIGNALS & HORNS ______			
AUDIBLE DISTANCE (FT X 100)			
SOUND ______			
APPROVED TYPE			
BRAKING SYSTEMS			
EMERGENCY ______			
DISCS ______			
DRUMS ______			
FLUID LEVEL ______			
FORCE			
TOTAL			
FRONT AXLE			
EQUALIZATION			
HOSES ______			
ABRASIONS ______			
LEAKS ______			
LINING WEAR ______			
BONDED ______			
RIVETED ______			
PEDAL RESERVE			
POWER			
STOPPING DISTANCE (FT)			
DECELERATION ______			
PARKING ______			
ACTUATOR ______			
STOPPING DISTANCE (FT) ______			
SERVICE ______			
DISCS ______			
DRUMS (MAX O.S. ALLOWED) ______			
FLUID LEVEL (14) ______			
FORCE (%)			
TOTAL (% OF GVW) ______			
FRONT TO REAR RATIO (%)			
EQUALIZATION (SIDE TO SIDE DIFF %) ______			
HOSES ______			
ABRASIONS ______			
LEAKS ______			
LINING WEAR ______			
BONDED (THICKNESS REMAINING) ______			
RIVETED (THICKNESS ABOVE HEAD OF ATTACHED RIVET) ______			
PEDAL RESERVE OR PROPORTION OR INCHES OF TRAVEL ______			

FIGURE 14

	PUBLIC SERVICE VEHICLES	TRUCKS	CARS
SERVICE (Continued) POWER STOPPING DISTANCE (FT X 10) DECELERATION (FT/SEC/SEC) _______			
CONTROLS _______ ACCESSIBLE _______ ANTI-THEFT DEVICES IDENTIFICATION STARTER GEAR			
ENERGY ABSORPTION SYSTEMS COLLAPSIBLE STEERING COL PADDING			
ELECTRICAL SYSTEM _______ BATTERY _______ FUSING GENERATOR REGULATION WIRING _______			
EXHAUST SYSTEMS _______ LEAKS _______ HOSE _______ PATCHES THRU PASS COMPARTMENTS			
GASOLINE TANKS & LINES _______ CRASH PROTECTION LEAKS _______ VENTED			
GLAZING _______ DRIVER SIDE MUST OPEN _______ SAFETY GLASS _______ VISIBILITY _______ CRACKS (INCHES) _______ FOREIGN MATERIALS			
INSTRUMENTATION HI BEAM INDICATOR ODOMETER SPEEDOMETER _______			
OCCUPANT RESTRAINT SYSTEMS HEAD			

FIGURE 14 (Continued)

	PUBLIC SERVICE VEHICLES	TRUCKS	CARS
OCCUPANT RESTRAINT SYSTEMS (Continued) PASSIVE SEAT BELTS ______			
POLLUTION CONTROL SYSTEMS CARBON MONOXIDE HYDROCARBONS NITROGENCARBONS NITROGEN OXIDES			
REAR VIEW MIRRORS ______ EXTERNAL ______ IMAGE SIZE INTERNAL ______ VISIBILITY DISTANCE (FT X 100)			
STEERING & SUSPENSION ______ ALIGNMENT CAMBER CASTER TOE BALL JOINTS–UNLOADED (MILD) ______ BINDING STR WHEEL ______ FREE-PLAY STR WHEEL (IN) ______ KING PINS PLAY AT MEAS POINT ______ POWER STEERING ______ BELTS ______ PUMP ______			
STEERING SUSPENSION SIDE SCUFF (FT/MI X 10) SHOCKS (OSCILLATIONS) SPRINGS ______ WHEEL BEARINGS ______ WHEEL TRACKING			
TIRES, WHEELS & RIMS ______ CONNECTIONS ______ DAMAGE ______ REPAIRS SIZE THREAD WEAR (IN) ______ TYPE ______ VALVES			
VEHICLE IDENTIFICATION ______ MOTOR NO. ______ REGISTRATION CERTIFICATE ______			

FIGURE 14 (Continued)

	PUBLIC SERVICE VEHICLES	TRUCKS	CARS
VEHICLE IDENTIFICATION (Continued)			
SERIAL NO. ________			
TAG NO. ________			
VISUAL SIGNALS & LAMPS			
DIRECTIONAL LAMPS ________			
COLOR ________			
FRONT ________			
REAR ________			
FLASH RATE NOMINAL ________			
FLASHES (PER MIN)			
LENS DAMAGE ________			
OUTPUT (CP)			
VISIBILITY DISTANCE (FT X 100)			
FRONT (FT X 100)			
REAR (FT X 100)			
HAZARD WARNING LAMPS			
COLOR			
FRONT			
REAR			
FLASH RATE			
LENS DAMAGE			
OUTPUT			
VISIBILITY DISTANCE (FT X 100)			
FRONT (FT X 100)			
REAR (FT X 100)			
HEAD LAMPS ________			
SERIES/TYPE			
AIM–V ________			
M			
OUTPUT (CP)			
VISUAL DISTANCE (FT X 100)			
SERIES/TYPE			
AIM–V			
M			
OUTPUT (CP)			
VISUAL DISTANCE (FT X 100)			
VISUAL SIGNALS & LAMPS			
LICENSE PLATE LAMPS ________			
COLOR ________			
LENS DAMAGE			
OUTPUT			
VISIBILITY DISTANCE (FT)			

FIGURE 14 (Continued)

	PUBLIC SERVICE VEHICLES	TRUCKS	CARS
REFLECTORS ______ COLOR ______ DAMAGE ______ VISIBILITY DISTANCE (FT X 100)			
RESERVE FRONT LAMPS (SIDE) ______ COLOR ______ LENS DAMAGE ______ OUTPUT VISIBILITY DISTANCE (FT X 100) ______			
SIDE MARKER LAMPS COLOR FRONT REAR LENS DAMAGE OUTPUT VISIBILITY DISTANCE (FT X 100)			
STOP LAMPS ______ ACTUATOR ______ COLOR ______ LENS DAMAGE ______ VISIBILITY DISTANCE (FT X 100) ______			
TAIL LAMPS ______ COLOR ______ LENS DAMAGE ______ VISIBILITY DISTANCE (FT X 100) ______			
WINDSHIELD CLEARING DEVICES ______ DEFOG & DEFROST ______ AREA CLEANED/TIME AIR FLOW TEMPERATURE			
WASH & WIPE ______ AREA CLEARED ______ ARM TENSION BLADE DETERIORATION ______ FREQUENCY SPEED			
INSPECTION FREQUENCY/TYPE PERIODIC (PER YR) ______ RE-SALE POST REPAIR RANDOM ______ VOLUNTARY			
INSPECTOR SKILL TESTS ______ PERFORMANCE ______ WRITTEN			

FIGURE 14 (Continued)

PART SIX

UNITED STATES

General Remarks

Institutions in Charge of Inspection

Qualification and Training of Personnel

Additional Considerations

PART SIX

UNITED STATES

General Remarks

In the United States, most safety experts agree that there can be no doubt that vehicles must be in proper working condition to be operated safely on the highways, and accident investigation programs have verified that vehicle defects are factors in accidents (8) (see page 117). At the same time, deterioration of a vehicle with time is inevitable and is due to a variety of factors such as wear, manufacturing defects, improper repair or maintenance, faulty repair parts, and other causes. The deterioration of vehicles must be controlled by some means to ensure a certain measure of traffic safety. The method of controlling vehicle deterioration is subject to some controversy in the United States. Fundamentally, the condition of a vehicle is the responsibility of the owner. To underscore this basic philosophy, most State laws, whether or not the State has an inspection program, include the following type of provision:

> "No person shall drive or cause to move on any highway any motor vehicle, . . . unless the equipment thereon is in good working order and adjustment . . . so as not to endanger the driver or other occupant or any person upon the highway."

Regardless of this type of statement, individual responsibility has not resulted in keeping defective vehicles off the highways. Also, the point is made that vehicles are too complex to be subject only to owner and driver maintenance. Certain degradation modes only affect the performance of the vehicle significantly in drastic or limit maneuvers and the effect of these degradation modes on everyday driving are nonexistent or compensated for by the driver. The driver, therefore, cannot be expected to know of or correct all safety defects in his vehicle since he is improperly motivated and does not have technical competence.

All of the above argue for some type of inspection program in order to ensure that vehicles being operated on the highways are in the best possible condition with respect to safety. In the United States, motor vehicle inspections have been closely related to growth of the automobile in the transportation system. Voluntary inspection programs were initiated in 1926 in the State of Massachusetts. A year later, both New York and Maryland began a voluntary inspection program. By 1929, three States, Pennsylvania, Maryland, and Massachusetts, had enacted legislation requiring periodic inspection at private, officially designated inspection stations. Connecticut, Delaware, Maine, New Hampshire, Rhode Island, Vermont, and Virginia had similar programs by the close of 1933.

Seven other jurisdictions which had enacted compulsory vehicle inspection laws by 1940 were Colorado, Mississippi, New Jersey, North Carolina, Utah, Washington, and the District of Columbia, although the Mississippi program has never materialized due to a lack of funds. Before 1940, Arkansas and Nebraska enacted inspection statutes which were shortly repealed. Many State programs were dropped or curtailed during World War II. For example, the programs of Maryland and Connecticut were entirely abandoned, and the program for South Carolina was dropped in 1943 and not reenacted until 1969. After 1945 there was a renewed interest in motor vehicle inspection, and prior to the Federal safety legislation in 1966, 20 States and the District of Columbia had motor vehicle inspection. Arizona began an inspection program in 1963, but it was dropped two years later. After the Federal safety legislation of 1966, 11 States began motor vehicle inspection programs. At the present time, the status of State periodic inspection programs is summarized in Figure 15.

STATES REQUIRING PERIODIC MOTOR VEHICLE INSPECTION

State	Year of Enactment
Arkansas	1969
Colorado	1935
Delaware	1933
Florida	1968
Georgia	1965

FIGURE 15

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State	Year of Enactment
Hawaii	1957
Idaho	1968
Indiana	1969
Kentucky	1968
Louisiana	1961
Maine	1931
Massachusetts	1930
Mississippi	1961
Missouri	1969
Nebraska	1969
New Hampshire	1931
New Jersey	1938
New Mexico	1953
New York	1957
North Carolina	1966
Oklahoma	1969
Pennsylvania	1929
Rhode Island	1959
South Carolina	1969
South Dakota	1968
Texas	1951
Utah	1936
Virginia	1932
West Virginia	1955
Wyoming	1968
District of Columbia	1939

FIGURE 15 (Continued)

The States of California, Michigan, Minnesota, North Dakota, Ohio, Washington, and Wisconsin have random inspection. Both Alabama and Tennessee authorize localities to conduct annual inspections. Connecticut, Iowa, and Maryland have registration or reregistration inspection requirements. Illinois requires semiannual inspection of trucks. Alabama, Arizona, Kansas, Montana, and Nevada have no formal inspection programs.

As can be seen from the above, motor vehicle inspection in the United States presents an example of all the different types of inspection programs. Besides the type of inspection program, there are other differences, such as inspecting authority, inspection interval, and technical inspection criteria. Although most inspection programs are based on the American National Standards Institute (ANSI) Standard D7, there are differences in interpretations of the standard, degree of implementation, and enforcement.

It is difficult, if not impossible, to determine the reason the different States have adopted different programs. However, in most cases, one can surmise that the reason was economic. For example, it would be easier for a small jurisdiction, such as the District of Columbia, to justify governmentally owned and operated facilities than for a State like Pennsylvania to do the same. Likewise, considering the pressure the public can bring to bear on their elected representatives, it is not surprising that most systems are based on a nominal fee and thus are nominal systems since very little supplemental tax funds are used for these programs.

Each of the State programs is described in more detail in a later section, but no further reasons for the various programs are given. In some cases, however, the reason for a particular program can be related to the Federal role in promoting motor vehicle inspection (MVI). The Federal role is strictly one of persuasion of the States to adopt a periodic motor vehicle inspection (PMVI) program. This role is based on the passage in 1966 of the Highway Safety Act, which states that standards be promulgated for approval of State programs in areas, including vehicle inspection, related to highway safety. The Secretary of Transportation is given authority to reduce by 10 percent any Federal aid highway funds apportioned to a State which does not take steps to implement an approved highway safety program. All States were to have submitted their program plans for approval by January 1, 1969. However, the approval deadline has since been extended.

In compliance with the provision of the Highway Safety Act of 1966, Highway Safety Program Standard No. 1 was issued on June 27, 1967, by the Secretary of Transportation (9) (see page 117). This standard set forth the minimum requirements for a State motor vehicle inspection program. The essence of this standard is that "Each State shall have a program for periodic inspection of all registered vehicles or other experimental, pilot, or demonstration program approved by the Secretary, to reduce the number of vehicles with existing or potential conditions which cause or contribute to accidents or increase the severity of accidents which do occur, and shall require the owners to correct such conditions." A Highway Safety Program Manual was prepared to provide guidance to the States on the details of the MVI program (10) (see page 117).

As a result of the Federal entry into the highway safety field and the promulgation of Highway Safety Program Standard No. 1, eleven States have begun

MVI programs, as mentioned above. Those States which do not have PMVI or any MVI have not been subject to the 10 percent reduction in the Federal aid highway funds due to the phrase in the Standard, ". . . or other experimental, pilot, or demonstration program approved by the Secretary . . ." At the present time, all States not in compliance with the Standard are being persuaded to begin a "pilot or experimental" program showing some activity toward compliance with the Standard.

Whereas the MVI activity of the Federal government is mandated by the Highway Safety Act, the criteria for inspection were to be promulgated as "Vehicle-in-Use Standards" in accordance with provisions of the Motor Vehicle Safety Act of 1966. To date, no standards have been issued and the Highway Safety Program Standard No. 1 refers to the inspection criteria of the American National Standards Institute Standard D7, "American Inspection Requirements for Motor Vehicles, Trailers, and Semitrailers Operated on Public Highways" (11) (see page 117). Most State programs are based on Standard D7, although the degree of compliance varies from State to State.

The requirements of Highway Safety Program Standard No. 1 were developed without much supporting research. Since the Standard was promulgated, considerable research has been accomplished with Federal traffic safety research funds. This research has been directed toward both the philosophy and justification for MVI as well as the technical aspects of inspection items, criteria, techniques and equipment, and intervals, with emphasis on the latter areas. The research program of the National Highway Traffic Safety Administration (NHTSA) and results of the program are described in a report (12). However, it is appropriate here to give at least one example of how research has provided support to the original decisions expressed in the Standard.

A study[1] was completed in August 1971, whose purpose was to determine the effectiveness of various MVI programs in terms of their ability to reduce on-road vehicle defects. The results of this study showed that there was a significant difference in the condition of vehicles in Pennsylvania, New Jersey, and Washington, D.C., all of which have PMVI, and the condition of vehicles in California which has random MVI, with the vehicles in the PMVI jurisdictions being in significantly better condition than those in the random MVI State. This result indicated that the Federal commitment to *periodic* MVI was appropriate, and the Federal emphasis, in the actions and policies of the National Highway Traffic Safety Administration (NHTSA), continues in the direction of Highway Safety Program Standard No. 1. The current Federal program is summarized in the Vehicle-in-Use Program Plan (13) (see page 117).

LEGAL PROVISIONS, QUALITY CONTROL, AND COMPULSORY MEASURES

At the Federal level, the legal provisions are embodied in Public Law 89-563, the National Traffic and Motor Vehicle Safety Act of 1966, and Public Law 89-564, the Highway Safety Act of 1966. Each act specifically mentions motor vehicle inspection.

From PL-89-563,

> "In order to assure a continuing and effective national traffic safety program, it is a policy of Congress to encourage and strengthen the enforcement of State inspection of used motor vehicles. Therefore, to that end the Secretary (of Transportation) shall conduct a thorough study and investigation to determine the adequacy of motor vehicle safety standards and motor vehicle inspection requirements and procedures applicable to used motor vehicles in each State, and the effect of programs authorized by this title upon such standards, requirements, and procedures for used motor vehicles, and report to Congress as soon as practicable but not later than one year after the date of enactment of this title, the results of such study, and recommendations for such additional legislation as he deems necessary to carry out the purpose of this Act. As soon as practicable after the submission of such report, but no later than one year from the date of submission of such report, the Secretary, after consultation with the (National Motor Vehicle Safety Advisory) Council and such interested public and private agencies and groups as he deems advisable, shall establish uniform Federal motor vehicle safety standards applicable to all used motor vehicles. Such standards shall be expressed in terms of motor vehicle safety performance. The Secretary is authorized to amend or revoke such standards pursuant to this Act."

From PL-89-564,

> "Each State shall have a highway safety program approved by the Secretary designed to reduce

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[1] Contract No. FH-11-7525, "Vehicle-in-Use Safety Standards" (12).

traffic accidents and deaths, injuries, and property damage resulting therefrom. Such programs shall be in accordance with uniform standards promulgated by the Secretary. Such uniform standards shall be expressed in terms of performance criteria . . . such uniform standards shall include, but not be limited to, . . . vehicle registration, operation, and inspection."

The report[2] required in PL-89-563 has been issued. However, the safety standards for used motor vehicles have not been issued as such but are, in effect, part of the Highway Safety Program Standards and the Highway Safety Program Manual. These were issued in compliance with the provisions of PL-89-564.

The Secretary has the authority to withhold 10 percent of the highway construction funds allocated to each State if that State does not comply, or move toward compliance, with the Highway Safety Program Standards. To date, this penalty has not been assessed, since most States not in compliance are making some attempt toward compliance.

At the State level, there are individual State laws that are the authority for the inspection programs. The inspection laws of all States with inspection programs have basically similar features even though the inspection programs of the various States may be quite different. This is because of the National Committee on Uniform Traffic Laws and Ordinances, an independent, nonprofit, voluntary association which maintains a "Uniform Vehicle Code" (UVC) as a comprehensive national guide for State motor vehicle and traffic laws. The section of the Uniform Vehicle Code on motor vehicle inspection has been in existence as guidance to the States since 1934, with major revisions occurring in 1938 and 1968. The text of Chapter 13 of the Uniform Vehicle Code (13) is referenced on page 117. For comparison to the Uniform Vehicle Code, the inspection laws of the State of Washington (with a random inspection program) and the District of Columbia (with a periodic program with publicly owned facilities) (15) are referenced on page 117.

The laws of the various States and the UVC basically have the following provisions:

- **Vehicles without required equipment or in unsafe condition** – This provision makes it unlawful to operate a vehicle not in "safe mechanical condition" on any highway.
- **Inspection by officers** – This provision authorizes uniformed police officers to inspect a vehicle at any time when unsafe condition is suspected.
- **Owners and drivers to comply with inspection laws** – This provision makes it unlawful to refuse an inspection.
- **Periodic inspection required** – This provision sets the inspection requirements for vehicles and the consequences of rejection.
- **Commissioner may establish stations; Appointment of official inspection stations; Operation of inspection stations; Display of inspection certificates; etc.** – These provisions set the details of the inspection system.

Of course, as explained above, not all States have these provisions since some States have random programs and some have no programs; but, in essence, the above represents the typical legal authority for the inspection programs in the States.

Quality control of the inspection is again carried out at the Federal level and the State level. At the Federal level, an informal program of State audits was initiated in 1970 and a formal procedure initiated in 1972. In both programs, vehicles are selected at random off the road, or owners are invited by newspaper advertising or by mail to have their vehicles inspected free of charge and with no penalty assigned for failure to pass. The vehicles are then inspected in preselected diagnostic centers using inspection criteria and equipment/procedures developed for this program or using the Mobile Motor Vehicle Inspection Facility[3] using the same criteria and equipment/procedures. The informal audit program is referenced on page 117 (12). Research Summaries H, R, and S. The first formal State audit is still in progress and no results are yet available.

The results of these State audits will be used to compare the results of the inspection programs of the various States in terms of the condition of vehicles on the highways. This information will identify those States whose programs are not as effective as desired and which should upgrade their programs. The basis for the upgrading will be Highway Safety Program Standard No. 1 and the Highway Safety Program Manual (see page 117, references (9) and (10), respectively.

Quality control at the State level is, in general, the responsibility of the State police. In most jurisdictions with State appointed inspection stations, State police officers are assigned several or many stations which they must monitor. Monitoring of the stations ranges from sending vehicles with known defects through stations to only investigating complaints from the public. In some States all the State police are assigned a few stations each, whereas in other States, a few officers are assigned very many stations. This results in a wide variation in the extent of monitoring.

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[2] "Safety for Motor Vehicles in Use," A report to the Congress of the United States pursuant to PL-89-563, Jan. 1968

[3] Contract No. FH-11-7290, "Mobile Inspection Equipment and Techniques" (12).

Another form of inspection station monitoring comes from the analysis of data supplied by the individual inspection stations. In this situation, deviating stations are identified in comparison to the average inspection results of all other stations. For State-owned inspection stations, this is one way of quality control. Another means of control for these stations is the general qualifications of the inspectors and supervisors. Since the staff members of the stations are civil servants, there is no incentive to find nonexistent defects and sell repairs or to perform a cursory examination of the vehicle and make more profit from the inspection fee. In general, the quality control of State-owned facilities is much easier than for State-appointed stations since there are far fewer facilities. On the other hand, there is great pressure from the public to keep expenditures of public funds in check, which tends to suppress the rigor of the inspection.

The qualifications of the inspector and the supervisor are not, in themselves, nearly enough to [illegible] quality inspections in the various programs in the U.S. This is because inspector training is very informal, or does not exist at all, and continual or retraining programs are nonexistent. In many State programs with State-appointed inspection stations, the lowest level mechanic, the gas station employee, is the authorized inspector. The selection of the inspector is based on a very cursory examination of the relevant knowledge of the inspector.

Compulsory measures are also applied at both the Federal level and the State level. At the Federal level, the Highway Safety Act of 1966 authorizes the Secretary of Transportation to withhold 10 percent of a State's allocated Federal highway construction funds if the State does not have an approved inspection program. As mentioned in "General Remarks," this penalty has not been assessed.

All State programs are mandatory for the vehicle owner and failure to comply with the provisions of the inspection laws results in some form of punishment. Rejection of a vehicle as a result of inspection requires repair to correct the defect. In some cases, the vehicle can be driven without penalty if the repairs are made in a certain specified time. In other cases, the vehicle cannot be operated until repairs are made, and any operation is subject to a penalty. In some programs, the vehicle license plates are confiscated and the vehicle condemned if the vehicle's condition so warrants. This usually only occurs if the vehicle has reached the limit of its useful life.

To cite a typical example, in South Carolina the legal provision states that the vehicle may not be driven after failure to pass inspection except to return the vehicle to the place of residence of the owner or to a garage or service station, and only at the discretion of the inspection officer. Failure to comply with the provisions of the law are punishable by a fine of not less than $25 or more than $100, or by imprisonment of not more than thirty days.

In New Jersey, the registration of a vehicle which does not display a valid inspection approval certificate can be revoked. Further, the legal provision states,

> "Any person who refuses to have his motor vehicle examined, or, if after having it examined, refuses to place a certificate of approval, if issued, upon his windshield, or who fraudulently obtains a certificate of approval, or who refuses to place his motor vehicle in proper condition after having the same examined, or who in any manner, fails to conform to the provisions of the chapter (relating to inspection) shall be guilty of violating the provisions of this chapter, and shall for a first offense, be subject to a fine of not more than $100.00 and, for a second offense, to a fine of not more than $200.00 or by imprisonment for not less than 30 days, or both such fine and imprisonment."

In most jurisdictions, it is the responsibility of the inspection authority only to inspect the vehicle and either accept or reject it. Any legal actions for failure to comply with inspection provisions are the responsibility of the State police. The lack of an inspection sticker or the display of a rejection sticker is usually the means by which the police provide enforcement. In Pennsylvania, however, the inspection authority notifies the State police of a rejection and its details. The owner of the vehicle must notify the State police within five days that the vehicle has been corrected, or further action is taken.

NATURE AND SCOPE OF INSPECTION

At the Federal level, the only inspections conducted are of trucks involved in interstate commerce. These inspections are performed randomly and in accordance with the *Motor Carrier Safety Regulations*. These inspections focus on ascertaining that the vehicle has the required safety equipment and that the vehicle is in safe operating condition.

At the State level, inspections are based on the American National Standards Institute Standard D7, "Inspection Procedures for Motor Vehicles, Trailers, and Semitrailers Operated on Public Highways." This Standard (11) is referenced on page 117. A summary of the individual inspection requirements of the States for passenger cars is shown in Figure 16. These inspections are designed to determine that the vehicle is in safe operating condition which will continue to the next inspection. Although the State inspection programs are based on the same standards, a review of Figure 16 reveals a wide range of variation. This is in part due to local interpretation of loosely worded and subjective requirements in the standard. Because of this variation, it is the goal of the Federal effort to provide the States with more specific and objective inspection criteria which will force uniformity. Another objective of the Federal effort is to upgrade inspection such that a safety payoff is guaranteed and maximum safety benefits are realized.

Equipment utilized for inspection varies from State to State and ranges from hand tools to performance measuring equipment. In most States with State-appointed inspection stations, the equipment requirements are minimal. For example, Pennsylvania requires garage jacks, a vise, portable lights, wheel pullers, brake wrenches, a toe-in gauge, a light testing device, brake drum and lining gauges, and a ball joint gauge. State-owned facilities or facilities associated with diagnostic centers are the most complete. Besides basic hand tools these facilities usually are equipped with a full vehicle lift, a side-slip or roller type toe-in gauge, a platform type brake tester, and headlight aim and intensity equipment. No automated or semiautomated inspection facilities are in use in the U.S., and since most States with inspection programs have State-appointed facilities, very little performance equipment is used. One of the goals of the Federal program is the specification of inspection equipment. In many cases the equipment available is not suitable and the research program referenced on page 117 (12) also includes projects to develop equipment specifications and prototype equipment such that equipment manufacturers are properly guided.

TYPE APPROVAL AND DEFECT RECALL PROGRAMS

The U.S. does not have a type approval program. However, requirements are placed on vehicle and vehicle equipment manufacturers through the laws of the various States and the Federal Motor Vehicle Safety Standards. Equipment and performance requirements exist for such items as rearview mirrors, lights, braking performance, tire performance, and glazing.

The defect recall program of the U.S. is motivated by inevitable design and/or manufacturing defects of vehicles which result in safety hazards. The details of the program and sample defect campaigns are referenced on page 117 (16).

PERIODICITY OF INSPECTION

Inspection periods for the various State inspection programs are listed in Figure 17. As in all other aspects of the inspection program of the various States, this Figure shows variance. The optimum inspection interval cannot be specified and justified without question at this time. The Federal research program[4] has shown that vehicles in a State with two inspections per year are in significantly better condition than those in a State with one inspection per year, and vehicles in both of these are in better condition than those in a State with random or no inspection.

One of the goals of an inspection program should be to maximize the potential for a vehicle to operate free of defects during the time to the next inspection. To date there is no firm data that links inspection criteria to the inspection interval. Quite the contrary, it is known that inspection limits for brake lining thickness and for tire tread depth are too unconservative to allow a vehicle to operate safely until the next inspection if the interval is a year. Of course tire tread depth is easily observed, but brake lining thickness is undetectable to the driver unless there is no lining left and metal-to-metal contact is present. This has been certified during at least one research project[5] of those described on page 117 (12). Rather than defend a particular inspection interval, therefore, it is appropriate to state that research indicates that shortened intervals between inspections reduce vehicle defects and that inspection intervals and certain inspection criteria must be developed together. There is a point of diminishing economic and safety return as inspection intervals are shortened and the optimization of inspection intervals and certain inspection criteria is a goal of the U.S. program on motor vehicle inspection.

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[4] Contract No. FH-11-7525, "Vehicle-in-Use Safety Standards" (12).

[5] Contract No. DOT-HS-990-1-124, "Component Degradation: Braking Systems Performance" (12).

One obvious fact from research conducted to date is that random inspection programs do not reduce defects to the level of periodic programs. The effectiveness of reregistration inspection programs has not been tested, but, by extrapolating the results of other research, it is clear that the longer intervals between inspections will mean more defects for this type of program. Intuitively, the optimum safety program would include combined periodic inspection and a low-level random inspection. The random inspection would be for randomly occurring defects (such as light outages) and would only be conducted by the police upon recognition of an obvious defect. The random program would also include tire pressure and tread depth inspection. Tire pressure inspection would be included to stress the importance of this to vehicle safety since periodic inspection has very little effect on the defect. Tread depth inspection would be included because of its relation to safety and because random inspection for these defects would be easily accomplished. Reregistration inspection would only be of value in a program that included consumer benefits, since vehicle defects and the cost of correction would not be passed on to an unsuspecting buyer.

Eleven States and the District of Columbia have provisions for requiring vehicles involved in accidents to submit to inspection. A research study[6] was initiated in 1968 to (1) determine if vehicle inspection after an accident is desirable, to (2) develop criteria by which inspection is required, and to (3) develop inspection procedures for vehicles involved in accidents. A major conclusion of the study was that vehicle inspection after an accident and resulting repair is required. Therefore, any optimum program would include this type of inspection.

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[6] Contract No. FH-11-6886, "Alternative Inspection Policies and Special Vehicle Inspection" (12).

LIST OF ITEMS TO BE INSPECTED (UNITED STATES)

	ALABAMA	ALASKA	ARIZONA	ARKANSAS	CALIFORNIA	COLORADO	CONNECTICUT	DELAWARE	DISTRICT OF COLUMBIA	FLORIDA	GEORGIA	HAWAII	IDAHO	ILLINOIS	INDIANA	IOWA	KANSAS	KENTUCKY	LOUISIANA	MAINE	MARYLAND	MASSACHUSETTS	MICHIGAN	MINNESOTA	MISSISSIPPI
AUDIBLE SIGNALS (HORN)																✓	✓								
AUDIBLE DISTANCE (FT x 100)				2	2				2	2	2		2		2			2	2		2	✓	2	2	2
SOUND				M	M	M			M	M		✓	✓						✓	M	M		M	M	
APPROVED TYPE									✓																
BRAKING SYSTEMS				2	2												✓						2	2	
EMERGENCY																									
DISCS																									
DRUMS																									
FLUID LEVEL																									
FORCE																									
TOTAL																									
FRONT AXLE																									
EQUALIZATION																									
HOSES																									
ABRASIONS																									
LEAKS																									
LINING WEAR																									
BONDED																									
RIVETED																									
PEDAL RESERVE																									
POWER																									
STOPPING DISTANCE (FT)																									
DECELERATION																									
PARKING																								OPS	
ACTUATOR				✓	✓	✓			✓	✓		✓	✓		✓				✓	✓	✓		✓		
STOPPING DISTANCE (FT)						50															50	75			
SERVICE																✓									
DISCS						OEM			OEM	OEM			OEM		OEM				OEM		OEM				
DRUMS (MAX. O.S. ALLOWED) (DIAMETER)						80			80			✓	80		OEM				✓		OEM				
FLUID LEVEL (IN BELOW LEVEL)				OEM					✓	✓	✓	✓	1"		1"				1/2	1/2	✓				
FORCE (%)																									
TOTAL (% OF GVW)									52	50								✓	50					53	
FRONT TO REAR RATIO (%)									70	70	70				✓										
EQUALIZATION (SIDE TO SIDE DIFF %)				✓					20	25	20	25	✓		✓			✓	✓	✓	✓	✓	✓	✓	20 LB
HOSES						✓			✓																
ABRASIONS										✓		✓						✓	✓	✓	✓				
LEAKS				✓		✓			✓	✓	✓	✓	✓		✓			✓	✓	✓	✓	✓	✓		✓
LINING WEAR						✓																			
BONDED (THICKNESS REMAINING)						1/16			1/16	1/32			1/32		1/32				1/32	1/32	1/16				
RIVETED (THICKNESS ABOVE HEAD OF ATTACHING RIVET)						2/32			1/32	1/64			1/64		1/64				1/64	1/64	1/32				
PEDAL RESERVE (PROPORTION OR INCHES OF TRAVEL)				3"	1/3	1/3			1/3		3"	2/3"	3"		1/4			1/2	3"	1/3	1/3		1/3	1/5	3"
POWER				OPS	✓	OPS					✓		OPS		✓				✓	OPS	✓		✓	✓	✓
STOPPING DISTANCE (FT x 10)				3		4				2.7	3	3	2.5		2.5			3	2.5	3	3	2.5	3	2.5	3
DECELERATION (FT/SEC/SEC)											16	17			17				17		17		16	17	
CONTROLS									✓				OPS												
ACCESSIBLE (HORN, WIPERS)				✓		✓				✓		✓			✓			✓	✓	✓	✓		✓	✓	
ANTITHEFT DEVICES									✓																
IDENTIFICATION																									
STARTER GEAR INTERLOCK																									
ENERGY ABSORPTION SYSTEMS																									
COLLAPSIBLE STEERING COL										✓										✓					
PADDING																									

KEY	
✓	CHECK FOR
M	MUST BE IN PLACE AND FUNCTIONING AND OF ACCEPTABLE LOUDNESS
2	NUMBER OF SYSTEMS CHECKED (BRAKES)
OPS	OPERATIONAL
OEM	ORIGINAL EQUIPMENT MANUFACTURER'S SPECIFICATIONS
[illegible]	[illegible]
O/S	OVERSIZE
FED	FEDERAL MOTOR VEHICLE SAFETY STANDARD
SAE	SOCIETY OF AUTOMOTIVE ENGINEERS STANDARD
W	WHITE
A	AMBER
R	RED
IE	IF EQUIPPED
MCS	MOTOR CARRIER SAFETY REGULATIONS
0	NONE
<	LESS THAN
>	GREATER THAN
S	SINGLE HEADLIGHT PER SIDE
M	MULTIPLE HEADLIGHT PER SIDE
L	LENGTH OF CAR
ANSI	AMERICAN NAT'L STAND. INST.

REVISED 9-28-71 BY [illegible]

FIGURE 16

Reproduced from best available copy.

	MISSOURI	MONTANA	NEBRASKA	NEVADA	NEW HAMPSHIRE	NEW JERSEY	NEW MEXICO	NEW YORK	NORTH CAROLINA	NORTH DAKOTA	OHIO	OKLAHOMA	OREGON	PENNSYLVANIA	RHODE ISLAND	SOUTH CAROLINA	SOUTH DAKOTA	TENNESSEE	TEXAS	UTAH	VERMONT	VIRGINIA	WASHINGTON	WEST VIRGINIA	WISCONSIN	WYOMING
AUDIBLE SIGNALS & HORNS																										
AUDIBLE DISTANCE (FT × 100)	✓		✓		2	2	2	✓	2		2	✓	2	2	2	2	2		2	2	✓	2		2	2	✓
SOUND	✓		✓		✓	MI	✓	✓	MI						MI	MI	MI		MI	MI				MI		
APPROVED TYPE					✓																					
BRAKING SYSTEMS						2	2		2		2	2	2	2	2	2	2			2	2	2		2	2	
EMERGENCY																										
DISCS																										
DRUMS																										
FLUID LEVEL																										
FORCE																										
TOTAL																										
FRONT AXLE																										
EQUALIZATION																										
HOSES																										
ABRASIONS																										
LEAKS																										
LINING WEAR																										
BONDED																										
RIVETED																										
PEDAL RESERVE																										
POWER																										
STOPPING DISTANCE (FT)																										
DECELERATION																										
PARKING														OPS	OPS											
ACTUATOR	✓				✓	✓		✓	✓		✓	OPS	✓			✓	✓			✓	✓	✓		✓	✓	✓
STOPPING DISTANCE (FT)	✓								75												50					
SERVICE													✓	✓												
DISCS	1/16		OEM		OEM			✓						OEM			OEM			OEM		OEM				OEM
DRUMS (MAX. O.S. ALLOWED) (IN/1000)	✓		OEM					20						20	✓					20		✓				✓
FLUID LEVEL (IN BELOW LEVEL)	1/2		✓		1/2			✓	✓					✓	✓	✓	✓			1"	1/2	OEM		1/2		
FORCE (%)																										
TOTAL (% OF GVW)	55		50			45											53		55	55						
FRONT TO REAR RATIO (%)			70		✓	70			✓											67						
EQUALIZATION (SIDE TO SIDE DIFF %)	✓		✓		✓	20		20	✓		✓			✓	✓	✓	✓		20	22		8		8	✓	8
HOSES																										
ABRASIONS	✓		✓		✓			✓	✓					✓			✓		✓	✓	✓					
LEAKS	✓		✓		✓			✓	✓			✓		✓	✓	✓	✓		✓	✓	✓	✓		✓	✓	✓
LINING WEAR																										
BONDED (THICKNESS REMAINING)	1/32		1/32		1/32			1/16						25%	25%		1/32			1/32		1/32		1/16		1/32
RIVETED (THICKNESS ABOVE HEAD OF ATTACHING RIVET)	1/64		1/64		1/64			1/32						40%	40%		1/64			1/64		>0		>0		1/64
PEDAL RESERVE (PROPORTION OR INCHES OF TRAVEL)	1/5		2"		1"	1/2	1/5	1/3	1/3		1/2	✓		1/2		1/3	1/3		2"	2"	1/4	1/5		2"	1/5	1/5
POWER			✓				✓	✓			✓			✓	✓	✓			✓	✓		✓				✓
STOPPING DISTANCE (FT × 10)	2.5				3	3	3		7.5		3	✓	2.7	2.5	3		2.5		3	2.5	L	2.5		3		
DECELERATION (FT/SEC/SEC)	17		17			14	14							17			17							14		
CONTROLS																										
ACCESSIBLE (HORN, WIPER)	✓				✓	✓	✓	✓	✓		✓		✓	✓		✓	✓		✓		✓	✓				
ANTI-THEFT DEVICES																										
IDENTIFICATION																										
STARTER GEAR INTERLOCK																										
ENERGY ABSORPTION SYSTEMS																										
COLLAPSIBLE STEERING COL.					✓																					
PADDING																										

KEY	
✓	CHECK FOR
MI	MUST BE IN PLACE AND FUNCTIONING AND OF ACCEPTABLE LOUDNESS
?	NUMBER OF SYSTEMS CHECKED (BRAKES)
OPS	OPERATIONAL
OEM	ORIGINAL EQUIPMENT MANUFACTURER'S SPECIFICATIONS
[illegible]	[illegible]
OS	OVERSIZE
FED	FEDERAL MOTOR VEHICLE SAFETY STANDARD
SAE	SOCIETY OF AUTOMOTIVE ENGINEERS STANDARD
W	WHITE
A	AMBER
R	RED
EQ	IF EQUIPPED
MCS	MOTOR CARRIER SAFETY REGULATIONS
0	NONE
<	LESS THAN
>	GREATER THAN
S	SINGLE HEADLIGHT PER SIDE
M	MULTIPLE HEADLIGHT PER SIDE
L	LENGTH OF CAR
ANSI	AMERICAN NAT'L. STND. INST.

REVISED 8-20-71 BY [illegible]

FIGURE 16 (Continued)

	ALABAMA	ALASKA	ARIZONA	ARKANSAS	CALIFORNIA	COLORADO	CONNECTICUT	DELAWARE [illegible]	DISTRICT OF COLUMBIA	FLORIDA	GEORGIA	HAWAII	IDAHO	ILLINOIS	INDIANA	IOWA	KANSAS	KENTUCKY	LOUISIANA	MAINE	MARYLAND	MASSACHUSETTS	MICHIGAN	MINNESOTA	MISSISSIPPI
ELECTRICAL SYSTEM						OPS						✓													
BATTERY																									
FUSING													✓												
GENERATOR																									
REGULATOR																									
WIRING									✓	✓			✓						✓	✓	✓				✓
EXHAUST SYSTEM				✓							✓					✓	✓								
LEAKS				✓	✓	✓			✓			✓	✓		✓			✓	✓	✓	✓	✓			✓
NOISE					✓	✓			✓			✓	✓						✓	✓		✓	✓	✓	✓
PATCHES													✓		✓					✓	✓				
THRU PASS. COMPARTMENT				✓					✓			✓			✓				✓	✓	✓				✓
GASOLINE TANKS & LINES																				✓		✓			
CRASH PROTECTION																									
LEAKS									✓										✓		✓				
VENTED																					✓				
GLAZING																✓	✓								
DRIVER SIDE MUST OPEN						✓			OPS			✓	✓					✓	OPS		✓				✓
SAFETY GLASS				✓	✓	✓			ANSI		✓	✓	✓		ANSI			✓	✓	✓	✓		ANSI	✓	✓
VISIBILITY						✓																			
CRACKS (INCHES)				✓		✓			3		✓	✓	✓		1			✓	8	4	1/8	6	✓	✓	✓
FOREIGN MATERIALS (OBSTRUCTIONS)				✓	✓	✓			✓		✓	✓	✓		✓			✓	✓	✓	✓	✓	✓	✓	✓
INSTRUMENTATION																									
HI BEAM INDICATOR				OPS	OPS	OPS			OPS				OPS		OPS			OPS	OPS	OPS	OPS	OPS	OPS	OPS	
ODOMETER																					OPS				
SPEEDOMETER						OPS			OPS										OPS		OPS				
OCCUPANT RESTRAINT SYSTEMS																									
HEAD																									
PASSIVE																									
SEAT BELTS									FSS		✓					✓			OPS				SAE	SAE	
POLLUTION CONTROL SYSTEMS (PCV VALVE ETC.)					OPS											✓									
CARBON MONOXIDE																								✓	
HYDROCARBONS																									
NITROGEN OXIDES																									
REARVIEW MIRRORS					2				1						1	✓	✓	1		1			1	1	
EXTERNAL																					✓		✓		
IMAGE SIZE																									
INTERNAL																					✓				
VISIBILITY DISTANCE (FT + 100)				2	3	2			✓		✓	2	2		2			2	3	3	2			2	
STEERING & SUSPENSION																✓	✓								
ALIGNMENT				✓								✓	✓						✓		✓				
CAMBER				✓					OEM									OEM	OEM	OEM	OEM				
CASTER				✓					OEM									OEM	OEM	OEM	OEM				
TOE				✓					OEM									OEM	OEM	OEM	OEM				3/16
BALL JOINTS UNLOADED (MILS)						250			250	250	275	✓	✓		OEM			250	250	250	250	OEM			
BINDING STR WHEEL				✓		✓			✓	✓	0	0	0		0			0	0	0	0		0	0	
FREE PLAY STR WHEEL (IN.)				3		3			3	2	20	2	2		3			2	2	2	2	40	2	3	✓
KING PINS (PLAY AT MEAS. POINT)						1/4"			1/4"	1/4"					1/4"										
POWER STEERING						OPS			OEM		OPS	OPS	OPS							OPS			OPS		
BELTS									OEM	✓								✓							
PUMP									OEM									✓							

KEY	
✓	CHECK FOR
M	MUST BE IN PLACE AND FUNCTIONING AND OF ACCEPTABLE LOUDNESS
#	NUMBER OF SYSTEMS CHECKED [illegible]
OPS	OPERATIONAL
OEM	ORIGINAL EQUIPMENT MANUFACTURER'S SPECIFICATIONS
OBS	OBSERVE
O.S.	OPTIONAL
FSS	FEDERAL MOTOR VEHICLE SAFETY STANDARD
SAE	SOCIETY OF AUTOMOTIVE ENGINEERS STANDARD
W	WHITE
A	AMBER
R	RED
EQ	IF EQUIPPED
MCSR	MOTOR CARRIER SAFETY REGULATIONS
[illegible]	[illegible]
<	LESS THAN
>	GREATER THAN
S	SINGLE HEADLIGHT PER SIDE
M	MULTIPLE HEADLIGHT PER SIDE
L	LENGTH OF CAR
ANSI	AMERICAN NAT'L. STD. INST.

[illegible]

FIGURE 16 (Continued)

	MISSOURI	MONTANA	NEBRASKA	NEVADA	NEW HAMPSHIRE	NEW JERSEY	NEW MEXICO	NEW YORK	NORTH CAROLINA	NORTH DAKOTA	OHIO	OKLAHOMA	OREGON	PENNSYLVANIA	RHODE ISLAND	SOUTH CAROLINA	SOUTH DAKOTA	TENNESSEE	TEXAS	UTAH	VERMONT	VIRGINIA	WASHINGTON	WEST VIRGINIA	WISCONSIN	WYOMING
ELECTRICAL SYSTEM																										
BATTERY																				✓					✓	
FUSING																				✓					✓	
GENERATOR																									✓	
REGULATOR																									✓	
WIRING	✓		✓		✓	✓	✓	✓	✓							✓	✓		✓	✓	✓	✓		✓	✓	
EXHAUST SYSTEM														✓												
LEAKS	✓		✓		✓	✓	✓				✓		✓	✓	✓		✓		✓	✓	✓	✓		✓		✓
NOISE					✓	✓	✓				✓		✓	✓	✓		✓			✓	✓			✓	✓	
PATCHES			✓				✓							✓	✓		✓			✓	✓	✓		✓	✓	✓
THRU PASS. COMPARTMENT	✓				✓	✓											✓		✓					✓	✓	
GASOLINE TANKS & LINES			✓										✓				✓			✓	✓				✓	✓
CRASH PROTECTION																										
LEAKS					✓																					✓
VENTED																										
GLAZING												✓		✓												
DRIVER SIDE MUST OPEN	✓																✓					✓		✓	✓	✓
SAFETY GLASS	✓		✓		✓	✓	✓	✓			✓		✓	ANSI			✓			✓	ANSI	✓		✓	✓	✓
VISIBILITY																										
CRACKS (INCHES)	2		3/2		2	✓	✓	2					✓	3/2	0		2/2			0	0	7/8		3/2	1/2	✓
FOREIGN MATERIALS (OBSTRUCTION)	✓				✓	✓	✓	✓					✓		✓		✓			✓	✓	✓		✓	✓	✓
INSTRUMENTATION																										
HI BEAM INDICATOR	OPS		OPS		OPS	OPS	OPS	OPS	OPS		OPS	OPS	OPS	OPS	OPS	OPS	OPS		OPS	OPS	OPS	OPS		OPS	OPS	OPS
ODOMETER					OPS						✓					✓	OPS					✓		OPS		
SPEEDOMETER			✓		OPS									OPS	OPS		OPS							OPS	OPS	
OCCUPANT RESTRAINT SYSTEMS																										
HEAD																										
PASSIVE																										
SEAT BELTS	SAE						✓				✓		✓	OPS					✓			✓			SAE	
POLLUTION CONTROL SYSTEMS (PCV VALVE ETC.)	✓							OPS			OPS		✓						✓						✓	
CARBON MONOXIDE																										
HYDROCARBONS																										
NITROGEN OXIDES																										
REARVIEW MIRRORS						2		1					1				1			1	✓	1				
EXTERNAL						✓		✓												✓						
IMAGE SIZE																										
INTERNAL						✓																				
VISIBILITY (DISTANCE (FT.) > 100)	✓		✓		✓	✓	✓	✓			✓		2	2	2		2			2		2		2	2	✓
STEERING & SUSPENSION													✓													
ALIGNMENT														✓			✓			✓	✓			✓	✓	✓
CAMBER					OEM									OEM	✓		✓				✓					
CASTER					OEM									OEM			✓				✓					
TOE	½OEM		✓		OEM			✓						OEM > ½° OEM			✓				✓					
BALL JOINTS UNLOADED (MILS)	250		250		250			✓						OEM			OEM			OEM	250	250		100		
BINDING STR. WHEEL	0		0		0	✓	0	✓			0	0					0		0			0		0	0	
FREE PLAY STR. WHEEL (IN.)	2		2		2	3	2	2	3		90			2		3	3		2	3	2	3		3	45°	3
KING PINS (PLAY AT MEAS. POINT)					1/4"			✓						1/4"	1/4"					✓				✓		
POWER STEERING	OPS		OPS		OPS									OPS	✓	✓	✓		✓	✓	✓	✓		✓	✓	
BELTS	✓		✓		✓			✓	✓						✓	✓			✓						✓	
PUMP								✓	✓																	

KEY	
✓	CHECK FOR . . .
H	MUST BE IN PLACE AND FUNCTIONING AND OF ACCEPTABLE LOUDNESS
2	NUMBER OF SYSTEMS CHECKED (BRAKES)
OPS	OPERATIONAL
OEM	ORIGINAL EQUIPMENT MANUFACTURER'S SPECIFICATIONS
OBS	OBSERVE
O.S.	OVERSIZE
FED	FEDERAL MOTOR VEHICLE SAFETY STANDARD
SAE	SOCIETY OF AUTOMOTIVE ENGINEERS STANDARD
W	WHITE
A	AMBER
R	RED
EQ	IF EQUIPPED
MCS	MOTOR CARRIER SAFETY REGULATIONS
0	NONE
<	LESS THAN
>	GREATER THAN
S	SINGLE HEADLIGHT PER SIDE
M	MULTIPLE HEADLIGHT PER SIDE
L	LENGTH OF CAR
ANSI	AMERICAN NAT'L. STD. INST.

REVISION DATE 9/20/71

FIGURE 16 (Continued)

FIGURE 16 (Continued)

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	[illegible]
STEERING & SUSPENSION	[illegible]
SIDE SLIP (FT/MI = 10)	[illegible]
SHOCK OSCILLATIONS OR TERMINATIONS	[illegible]
SPRING DEFORMATION	[illegible]
WHEEL BEARING WEAR	[illegible]
WHEEL TRACKING	[illegible]
TIRES, WHEELS & RIMS	[illegible]
CONNECTIONS	[illegible]
DAMAGE	[illegible]
REPAIRS	[illegible]
SIZE	[illegible]
TREAD WEAR (IN.)	[illegible]
TYPE	[illegible]
VALVES	[illegible]
VEHICLE IDENTIFICATION	[illegible]
MOTOR NO	[illegible]
REGISTRATION CERTIFICATE	[illegible]
SERIAL NO	[illegible]
TAG NO	[illegible]
VISUAL SIGNALS & LAMPS	[illegible]
DIRECTIONAL LAMPS	[illegible]
COLOR	[illegible]
FRONT	[illegible]
REAR	[illegible]
FLASH RATE (NORMAL)	[illegible]
FLASHES PER MIN.)	[illegible]
LENS DAMAGE	[illegible]
OUTPUT (C.P)	[illegible]
VISIBILITY DISTANCE (FT × 100)	[illegible]
FRONT (FT × 100)	[illegible]
REAR (FT × 100)	[illegible]
HAZARD WARNING LAMPS	[illegible]
COLOR	[illegible]
FRONT	[illegible]
REAR	[illegible]
FLASH RATE	[illegible]
LENS DAMAGE	[illegible]
OUTPUT	[illegible]
VISIBILITY DISTANCE (FT × 100)	[illegible]
FRONT (FT × 100)	[illegible]
REAR (FT × 100)	[illegible]
HEAD LAMPS (***)	[illegible]
SERIES/TYPE	[illegible]
AIM V	[illegible]
H	[illegible]
OUTPUT (CP)	[illegible]
VISUAL DISTANCE (FT × 100)	[illegible]
SERIES/TYPE	[illegible]
AIM V	[illegible]
H	[illegible]
OUTPUT (CP)	[illegible]
VISUAL DISTANCE (FT × 100)	[illegible]

KEY	
✓	CHECK FOR . . .
**	MUST BE IN PLACE AND FUNCTIONING AND OF ACCEPTABLE LOUDNESS
2	NUMBER OF SYSTEMS CHECKED (BRAKES)
OPS	OPERATIONAL
OEM	ORIGINAL EQUIPMENT MANUFACTURER'S SPECIFICATIONS
OBS	OBSERVE
O.S	OVERSIZE
FED	FEDERAL MOTOR VEHICLE SAFETY STANDARD
SAE	SOCIETY OF AUTOMOTIVE ENGINEERS STANDARD
W	WHITE
A	AMBER
R	RED
EQ	IF EQUIPPED
MCS	MOTOR CARRIER SAFETY REGULATIONS
0	NONE
<	LESS THAN
>	GREATER THAN
S	[illegible] 7" [illegible] TYPE 2 OR 5-3/4" TYPE 1 HIGH BEAM
M	5-3/4 TYPE 2 OR 7" TYPE 2 LOW BEAM
L	LENGTH OF CAR
***	VISUAL AIM METHOD 4' × 10' SCREEN @ 25'
C.P	CANDLE POWER

REVISED [illegible] BY [illegible]

FIGURE 16 (Continued)

VISUAL SIGNALS & LAMPS
- LICENSE PLATE LAMP
  - COLOR
  - LENS DAMAGE
  - OUTPUT (C.P.)
  - VISIBILITY DISTANCE (FT)
- REFLECTORS
  - COLOR REAR/FRONT
  - DAMAGE (CRACKED, BROKEN)
  - VISIBILITY DISTANCE (FT x 100)
- [illegible] FRONT LAMPS ([illegible], SPOT, PASSING, DRIVING)
  - COLOR
  - LENS DAMAGE
  - OUTPUT (C.P.)
  - VISIBILITY DISTANCE (FT x 100)
- SIDE MARKER LAMPS
  - COLOR
    - FRONT
    - REAR
  - LENS DAMAGE
  - OUTPUT
  - VISIBILITY DISTANCE (FT x 100)
- STOP LAMPS
  - ACTUATOR
  - COLOR
  - LENS DAMAGE
  - VISIBILITY DISTANCE (FT x 100)
- TAIL LAMPS
  - COLOR
  - LENS DAMAGE
  - VISIBILITY DISTANCE (FT x 100)

WINDSHIELD CLEARING DEVICES
- DEFOG & DEFROST
  - AREA CLEARED/TIME
    - AIR FLOW
    - TEMPERATURE
- WASH & WIPE
  - AREA CLEARING
  - ARM TENSION
  - BLADE DETERIORATION
  - FREQUENCY (SPEED)

INSPECTION FREQUENCY/TYPE
- PERIODIC (PER YR)
- RE-SALE
- POST REPAIR
- RANDOM
- VOLUNTARY

INSPECTOR SKILL TESTS
- PERFORMANCE
- WRITTEN
- ORAL

KEY	
✓	CHECK FOR
#	NUMBER OF SYSTEMS CHECKED [illegible]
OPS	OPERATIONAL
OEM	ORIGINAL EQUIPMENT MANUFACTURER'S SPECIFICATIONS
[illegible]	[illegible]
[illegible]	[illegible]
FED	FEDERAL MOTOR VEHICLE SAFETY STANDARD
SAE	SOCIETY OF AUTOMOTIVE ENGINEERS STANDARD
W	WHITE
A	AMBER
R	RED
IE	IF EQUIPPED
MCS	MOTOR CARRIER SAFETY REGULATIONS
*	NONE
	LESS THAN
	[illegible]
S	SINGLE HEADLIGHT PER SIDE
M	MULTIPLE HEADLIGHT PER SIDE
L	LENGTH OF CAR
CP	CANDLE POWER

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FIGURE 16 (Continued)

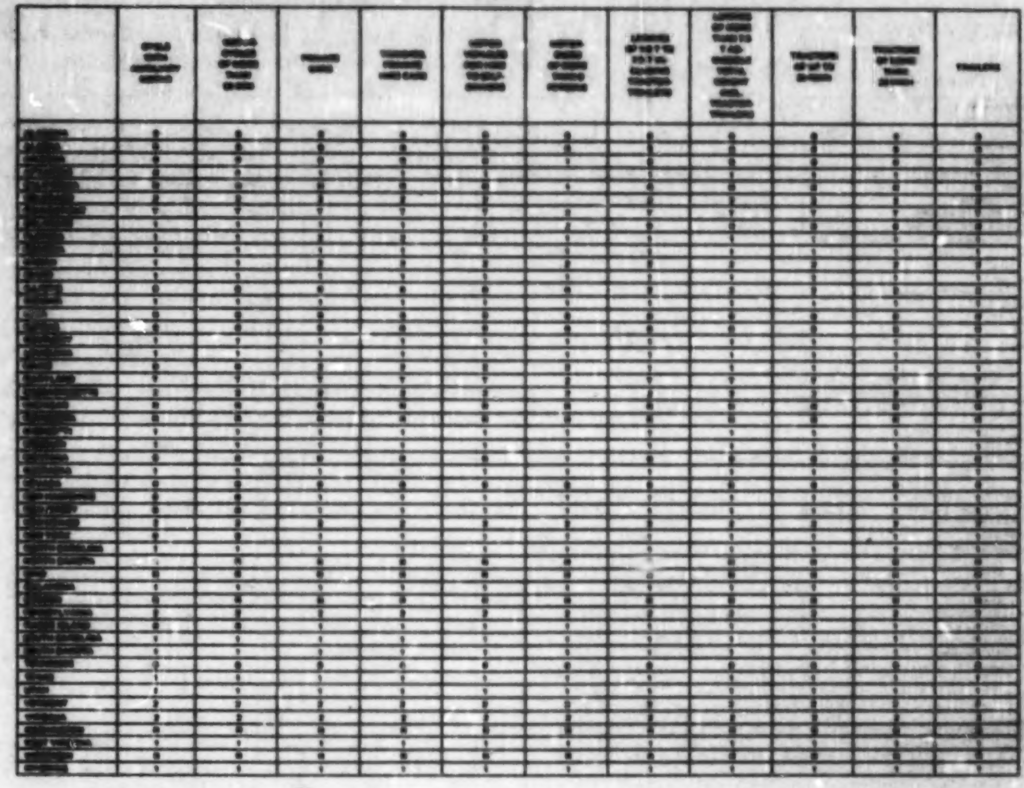
[illegible]

KEY	
√	CHECK FOR
#	NUMBER OF SYSTEMS CHECKED [illegible]
OPS	OPERATIONAL
OEM	ORIGINAL EQUIPMENT MANUFACTURER'S SPECIFICATIONS
OBS	OBSERVE
O/S	OVERSIZE
FMVSS	FEDERAL MOTOR VEHICLE SAFETY STANDARD
SAE	SOCIETY OF AUTOMOTIVE ENGINEERS STANDARD
W	WHITE
A	AMBER
R	RED
IE	IF EQUIPPED
MCSR	MOTOR CARRIER SAFETY REGULATIONS
N	NONE
	LESS THAN
	GREATER THAN
S	SINGLE HEADLIGHT PER SIDE
M	MULTIPLE HEADLIGHT PER SIDE
L	LENGTH OF CAR
CP	CANDLE POWER

REVISED [illegible] BY [illegible]

FIGURE 16 (Continued)

INSPECTION INTERVALS — UNITED STATES



KEY

1 = ONCE A YEAR
[illegible] = RANDOM INSPECTION
2 = ONCE EVERY 6 MONTHS
[illegible] = NO INSPECTION ON REGULAR BASIS

FIGURE 17

Institutions in Charge of Inspection

TYPE AND STATUS

The majority of inspection programs in the U.S. are based on State-appointed inspection stations (28 of 31 with periodic programs). The primary reason for this is economics. It costs the State very little in capital expenses, and the State-appointed inspection stations usually have all the equipment necessary for a normal inspection. Further, the State-appointed stations can expect to do repairs as a result of the inspection. The economics of State-appointed inspection stations are definitely a benefit to the States (the public) and to the inspecting station. The only other benefit is the convenience of having a larger number of stations. The major weakness of this type of system is the possibility for the inspecting stations to find nonexistent defects in order to sell repairs. Therefore, strict quality control is necessary for these systems to avert corruption and general public uproar. Another possible weakness is the general lack of performance measuring equipment. However, this is offset by the tendency of these programs to be more thorough (e.g., removing brake drums for brake inspection).

State-owned facilities do not benefit by finding defects that do not exist. At the same time, there is no particular incentive to find defects other than competence and pride in one's work. State-owned facilities are generally better equipped than State-appointed facilities and are designed for inspections only, meaning greater efficiency and throughput. One would logically conclude that State-owned facilities are desirable because the benefits seem to favor increased vehicle safety. However, there are liabilities with this system which tend to make the choice between State-owned and State-appointed facilities less clear. First, to keep capital expenses down, State-owned facilities are designed to service a large number of vehicles and a large area. This results in public inconvenience, which in turn pressures for reduced inspection times. Reduced inspection times means either automated equipment or reduced inspection coverage. To date, reduced inspection coverage has been the choice. A second liability of State-owned facilities is that they are supported by public funds. The concern about expanding State budgets and taxes has resulted in keeping inspection at a minimum in the State-owned facilities.

From the above, it has not been clear in the U.S. whether State-owned or State-appointed inspection facilities are better. Research to date has not allowed a choice between the two systems. In the study[7] mentioned in an earlier section, Pennsylvania with two inspections per year in State-appointed facilities showed fewer defects in the vehicle population than New Jersey and Washington, D.C., with one inspection per year in State-owned facilities. It is not clear if the lower defect rate in Pennsylvania is due to two inspections per year or to the State-appointed facilities system. However, it is known that the Pennsylvania system is one of the better State-appointed systems. A conclusion can be reached, when all of the systems in the U.S. are reviewed that State-appointed systems *can* be as good as the State-owned systems. However, as inspection rigor is increased, only State-owned facilities will be able to afford the required capital equipment.

An interesting concept for those States in the U.S. which have a low population density is a State-owned mobile inspection facility. A research study[8] found that this type of facility is entirely feasible. The time to set up equipment and repack it is compatible with frequent relocation. The quality of inspection can be high. Suitable locations for the inspection facility are easily located, and public acceptance is high.

SUPERVISION

For the State-owned facilities, a State organization exists whose only function is motor vehicle inspection. This organization in a State is constituted in a manner similar to other government organizations which must administer a program. Thus, supervision is accomplished within the organization and follows a line of ascending authority. The ultimate authority is the public who acts through their elected representatives in the State legislature.

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[7] Contract No. FH-11-7525, "Vehicle-in-Use Safety Standards"(12).

[8] Contract No. FH-11-7290, "Mobile Inspection Equipment and Techniques" (12).

In State-appointed systems, supervision is provided by the State agency with jurisdiction, normally the State police. Appointment of inspection stations, qualifications of the inspector, monitoring of activities, and reviewing of data are accomplished by the State police. More details of supervision are given on pages 93-95 and 109.

FEE SYSTEM

The State-owned systems are either fully or partially supported with general State revenues. In two of the three States with this type of system, a minimal fee ($1.00) is charged at registration renewal to offset some of the costs.

The State-appointed systems have either fixed or regulated fees. The fixed fees are part of the legal provisions. If the fees are not fixed, they are generally subject to approval by the supervisory authority. The fee for State-appointed systems averages $2.00 and must cover all costs of inspecting a vehicle at the station.

The fee structures for inspection in the U.S. have had a detrimental effect on the level of inspection. The history of inspection statistics reveals that fees were established prior to the technical details of inspection. Thus, the inspection programs were designed around the fee structures, instead of fees being established for the *required* level of inspection for a desired safety benefit. It is also hypothesized that the State-appointed station cannot perform a complete vehicle inspection to the specified requirements of the State unless they perform repairs on a certain percentage of the vehicles they inspect. Assuming that all repairs are legitimate, the only detrimental effect of this is that the level of inspection is reduced to where the fee covers costs.

COLLECTION AND USE OF DATA

At the Federal level, there is a requirement placed on the States of the U.S. to collect and disseminate data on inspections such as defect rates for vehicles by make and model. This requirement is contained in Highway Safety Program Standards No. 1 and the Highway Safety Program Manual.

Some States collect all data and comply with the Federal requirement to report defects by make and model. Other States do a manual count of number of vehicles inspected and number of vehicles rejected, by inspection area (e.g., brakes, tires, etc.).

There are many uses for this type of data. For example, the consumer could be influenced as to the make/model of new or used vehicles to buy, and manufacturers could identify problem components for design correction. In actuality, this data is used only for general information and to monitor the acitivities of specific inspection stations, as discussed under "Legal Provisions, Quality Control, and Compulsory Measures."

As a comparison of inspection programs and results between States, this data is not very useful. The inspection programs differ considerably in design, implementation, and enforcement which precludes meaningful comparisons of inspection data. Although the data is public information, no serious efforts to publicize and disseminate the data are made.

Qualification and Training of Personnel

MOTOR MECHANICS EMPLOYED IN REPAIR GARAGES

In the U.S., there are essentially no formal State requirements for the qualification and training of mechanics.

INSPECTORS AND SUPERVISORS EMPLOYED IN TESTING STATIONS

Qualifications for inspectors and supervisors are either nonexistent or very cursory, and all training is on-the-job. Most States require that "competent personnel" be employed in inspection stations and this is transformed in many cases to an inspection regulation covering the determiniation of competence. For example, Pennsylvania requires that "a mechanic must be over eighteen (18) years of age, be a resident of Pennsylvania, have a current Pennsylvania operator's license and may be approved as an Official Inspection mechanic only after passing an examination, which will include an actual inspection of a vehicle from start to finish, conducted by the Pennsylvania State Police Inspection Station Supervisor." The examination required in most States is for basic automobile mechanical knowledge, and for familiarity with the inspection regulations of the State.

Eight States have legal provision covering the qualification of inspectors. For example, in Indiana mechanics employed by inspection stations must be licensed and may not conduct inspections unless they have had one year working experience as an automotive mechanic or have graduated from an accredited vocational school. In Virginia, an inspector must have at least one year of practical experience as an automotive mechanic and must be approved by the department of State police.

There are no formal training programs in any of the State inspection programs. All training is on-the-job and consists of familiarization of the inspector with the details and standard practices of inspection. In most of the State-appointed programs, inspection can be thought of as a handed down craft. That is, one inspector trains another who is then approved by the State police.

Additional Considerations

AUTOMATED INSPECTION

Automated official or obligatory inspection does not exist in the U.S. There are however, diagnostic centers which have some automated equipment suitable for inspection. A study[9] in the "Highway Safety Program Manual" reports on the investigation of the feasibility of using diagnostic centers for official inspections. The results of the project showed that although existing inspection criteria would have to be revised to allow more sophisticated equipment, the use of diagnostic centers for efficient inspections would be economically feasible. However, because there are not large numbers of diagnostic centers, their use would have to be localized.

The U.S. position on the future application of automation to inspection is given in the report entitled "Automated Diagnostic Inspection Systems" (10).

VOLUNTARY INSPECTION

The U.S. has no provision for voluntary inspections.

CONSUMER INTERESTS

Although inspection may be considered in the best interests of the consumer, there are no formal programs for informing or aiding the vehicle owner as a consumer.

MISCELLANEOUS

The discussion in all the above sections describes a widely varying national inspection program in the U.S. as provided by the various States. It is the objective of the Federal Government to provide guidelines by which the program of the States can be updated to provide more safety payoff and be more uniform nationally. This will be accomplished by application of the current research and future research described in "Motor Vehicle inspection in the United States" (12). The final product of the Federal Effort will be a "Prototype Inspection Program" which will be demonstrated to the States.

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[9] Contract No. FH-11-7287, "Diagnostic Centers" (10).

PART SEVEN

CONCLUSIONS AND RECOMMENDATIONS

PART SEVEN

Conclusions and Recommendations

CONCLUSIONS

A thorough and critical review of the material presented in Parts One through Six leads to the following conclusions:

- MVI is pursued to varying degrees in most countries where vehicle safety, as related to vehicle condition, is a problem; the need for and form of MVI programs differ among various countries due to factors such as geography, vehicle usage, political motivation, etc.
- This inspection can be justified on safety, environmental and economic grounds, although the benefits are not adequately quantified.
- There is a very urgent need for the development and use of research methodologies for determining the extent to which MVI affects vehicle accident rates.
- There is a need to initiate or continue research programs in support of MVI. This research would focus on inspection criteria and methods, for the purpose of achieving an optimum vehicle-in-use safety program.
- There is a need for continuing international cooperation for the purpose of establishing uniform programs, or a uniform basis for programs, where desirable; and to exchange information on research results of international importance and to share the burden of conducting certain research or demonstration projects.
- There is agreement that MVI programs must continue and must be in a continual state of evolution in order to improve cost-benefit results.
- Because of the need for more objective evaluations of the safety and economic benefits of MVI, and for research to optimize MVI programs for the improvement of cost-benefit conditions, this report can only be considered to be interim, or a "state-of-the-art" review.

RECOMMENDATIONS

There should be efforts to achieve international agreement on criteria and methods of assessing and quantifying the safety, environmental and economic benefits and costs of MVI.

International research and harmonization should be progressed at all levels; in international harmonization, in bodies such as the EEC; at the technical level, in bodies such as the CITA; in research into the proper role and effectiveness of MVI, in continuing the work of NATO/CCMS.

National research is encouraged, and the methodology and results should be discussed and assessed in these international groups.

NEXT STEP

The Committee of Experts formed for this project (NATO/CCMS Road Safety Pilot Study/MVI project) should become an ad hoc committee under the auspices of the CCMS for the purpose of implementing and encouraging the adoption of the above recommendations.

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PART EIGHT

REFERENCE LIST OF PUBLICATIONS

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PART EIGHT

Reference List of Publications

REFERENCES REPORT ON MOTOR VEHICLE INSPECTION PROJECT
CCMS REPORT NO. 24

1. *List of Items to be Inspected at Testing Station.* (CITA/GT1/3 Rev. 3, September 13, 1972), Available in English from Comite International de L'Inspection Technique Automobile (CITA). Rue Royale 163, 1030 Brussels.
2. Extract from the German Road Licensing Regulations (Strassenverkehrs-Zulassungs-Ordnung = StVZO) as amended on July 13, 1971:
   - §29 StVZO, Inspection of motor vehicles and their trailers;
   - Anlage VIII zur StVZO. Inspection of vehicles,
   - Official motivation concerning the amending regulation of July 13, 1971.

   (Available in German through the German Project Leader[*])
3. Directions issued in connection with the German Road Licensing Regulations (Richtlinien zur Strassenverkehrs-Zulassungs-Ordnung = StVZO):
   - Directions for official recognition of repair shops and garages
   - Directions for assessment of tires
   - Directions for inspection records
   - Directions for execution of main inspections
   - Directions for execution of intermediate inspections
   - Directions for execution of special brake inspections

   (Available in German through the German Project Leader[*])
4. German law relating to automotive experts and relevant implementing regulations (Available in German through Project Leader[*])
5. Ingenieurmaessige Untersuchung von Unfaellen (Engineering Investigations of Accidents) by Dr. Ing. Helmut Schmachtenberg, et al. Deutsche Kraftfahrtforschung und Strassenverkehrstechnik, 1962, Heft 156. (Available in German from Technischer Ueberwachungsverein Rheinland e.V., Koeln, Federal Republic of Germany).
6. Tuev Technischer Ueberwachungs Verein Auto Report 1973–Safety Analyses, 1973 Edition. (Available in German from Verlag, Technischer Ueberwachungsverein Rheinland, GMBH, 5 Koeln 30, Lukasstrasse 90, Federal Republic of Germany.
7. *Goods Vehicle Testers Manual*, 1972 Edition. (Available in English from Her Majesty's Stationery Office, 49 High Holborn, London, WC1V 6HB)
8. *The Rule of Vehicle Defects in Accidents*, March 1973, NHTSA Staff Paper[***] (Available in English from NHTSA[**])
9. *Highway Safety Program Standards*, Standard 1 Periodic Motor Vehicle Inspection, February 1974, Booklet, DOT HS 820 307. (Available in English from NHTSA[**])

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[*] Mr. Karl Kurtz, Ministerialrat, Bundesminister fur Verkehr, Referat StV 6, 53 Bonn, Sternstrasse 100, Federal Republic of Germany

[**] NHTSA–National Highway Traffic Safety Administration, 400-7th Street, S.W., Washington, D.C., Attention General Services Division, Code N48-51.

[***] NHTSA Staff Paper–Prepared for CCMS Road Safety Pilot Study, Motor Vehicle Inspection Project.

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10. *Highway Safety Program Manual,* Volume 1–Periodic Motor Vehicle Inspection, January 1968, and Supplement 1, January 8, 1972. (Available in English from NHTSA**)
11. *U.S.A. Standard Inspection Procedures for Motor Vehicle Trailers and Semitrailers Operated on Public Highways,* October 9, 1968, D 7.1-1976. (Available from American National Standards Institute, 10 East 40th Street, New York, NY 10016)
12. *Motor Vehicle Inspection in the United States,* March 1972, NHTSA Staff Paper*** (Available in English from NHTSA**)
13. *Vehicle-In-Use Program Plan,* April 1972, DOT/HS 820 188. (Available in English from NHTSA**)
14. *Inspection Laws Annotated 1969,* II-Text of Uniform Vehicle Code Chapter 13: Inspection of Vehicles, Book. (Available in English from National Committee on Uniform Traffic Laws and Ordinances, 525 School Street, S.W., Washington, D. C. 20024)
15. *Inspection Laws Annotated 1969,* IV-Text of State Inspection Laws, Washington State, District of Columbia, Book. (Available in English from National Committee on Uniform Traffic Laws and Ordinances, 525 School Street, S.W., Washington, D.C. 20024)
16. *The Defects Investigation Program at the U.S. Department of Transportation,* March 1972, NHTSA Staff Paper***. (Available in English from NHTSA**)
17. *Automated Diagnostic Inspection Systems,* March 1972, NHTSA Staff Paper*** (Available in English from NHTSA**)

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